ORIGINS AND STRATEGIES FOR ADDRESSING ETHNIC AND RACIAL DISPARITIES IN PHARMACEUTICAL THERAPY

The Health-Care System, the Provider, and the Patient

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Dear Colleagues:

The Commission to End Health Care Disparities, comprised of leaders from national physician organizations and more than 50 state and specialty medical societies and other health professional organizations, works collaboratively to educate physicians and health professionals about health care disparities while identifying and developing strategies to eliminate gaps in care based on race and culture. The Commission is pleased to support the report, Origins and Strategies for Addressing Ethnic and Racial Disparities in Pharmaceutical Therapy: The Health-Care System, the Provider, and the Patient.

This report reviews studies that provide evidence of disparities in medication prescribing and adherence among racial and ethnic minority groups. The role of health care systems in fostering disparities in pharmaceutical treatment, the sub-optimal prescribing practices of providers and patients’ intentional or unintentional non-adherence are also addressed.

The health care system, providers and patients all contribute to disparities in medication use. Factors that prevent optimal prescribing practice include lack of knowledge about a particular minority group and communication issues on the part of physicians. Patient non-adherence because of drug cost, side-effects, health literacy, or cultural beliefs also affects use of medications. Health outcomes and the quality of care provided to all patients can be improved by increasing the awareness of disparities in pharmaceutical therapy that can stem from aggressive cost containment in pharmacy benefits plans, generic substitution, co-payments and prescription caps.

The Commission is committed to increasing awareness of the multiple causes of health care disparities and providing solutions to providers that address disparities in prescribing patterns, cultural literacy and communication problems. We support this report’s effort to increase awareness of disparities in pharmaceutical therapy and encourage drug programs to develop plans that are broad and flexible enough to allow physicians to provide individualized medication treatment to minority patients and promote quality care to all patients in the health care system.

Sincerely,

Ronald Davis, MD Sandra Gadson, MD
President Past President
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FOREWORD

As a result of innovations in pharmaceutical therapy over the last few decades, many persons with serious medical conditions can now enjoy a healthier, longer, and more productive life. However, access to medications and optimal use of them are not uniform across all populations in the United States. This report reveals the extent and nature of ethnic and racial disparities in pharmaceutical therapy. Extensive review of the research literature reveals large-scale medication disparities across many of the important illnesses affecting minority groups. These findings should make medication disparities an important focal point for organizations committed to improving the quality of health care and eliminating health-care disparities. We hope that a greater awareness of the extent of medication disparities will stimulate solutions and attract resources to address the problem. This report offers practitioners, health-care organizations, and health-care-policy planners and advocates recommendations for improving medication use in minority populations.

Gary A. Puckrein, PhD
President and Chief Executive Officer
National Minority Quality Forum

ABOUT THE NATIONAL MINORITY QUALITY FORUM

The National Minority Quality Forum (www.nmqf.org) is a non-profit, non-partisan research and education organization dedicated to ensuring the delivery of optimal care for a diverse society. The Forum addresses the critical need for strengthening national and local efforts to use evidence-based, data-driven initiatives. Forum programs seek to eliminate the disproportionate burden of premature death and preventable illness, including work on behalf of high-risk racial, ethnic and other special populations. Forum data and expertise support initiatives to eliminate health disparities and assist health-care providers, professionals, administrators, researchers, policy makers, and community and faith-based organizations in delivering appropriate health care. The Forum emphasizes programs based on science, research, and analysis that can lead to the effective organization and management of system resources, in order to improve the quality and safety of health care for the entire U.S. population, including minorities.
# Table of Contents

- **Key Findings** .................................................. vii
- **About the Authors** .......................................... viii
- **Acknowledgements** ......................................... viii
- **Chapter Organization** ....................................... ix
- **Executive Summary** .......................................... x
  - Origins of Pharmaceutical Disparities ........... x
  - Recommendations for Reducing Pharmaceutical Disparities ...... xii
- **Chapter I. Overview of Disparities in the Use of Pharmaceuticals** ................. 1
  - Summary ....................................................... 1
  - Disparities in Use of Medications............ 1
  - Disparities in Use of Medications for Specific Diseases ......................... 2
    - Asthma .................................................... 3
    - Depression ............................................. 6
    - Cardiovascular Disease ......................... 6
    - HIV/AIDS .............................................. 7
    - Influenza and Pneumonia Vaccinations..... 7
- **Chapter II. Pharmaceutical Disparities: The Health-Care System** .................... 9
  - Summary ....................................................... 9
  - Medication Disparities Due to Lack of Insurance ........................................... 9
  - Medication Disparities Due to Pharmaceutical-Cost-Containment Policies 11
    - Prior Authorization.................................. 11
    - Medication Caps ..................................... 11
    - Generics ............................................... 12
    - Preferred-Drug Lists .............................. 13
    - Co-payments ......................................... 13
    - Disparities at the Pharmacy Counter........ 15
- **Chapter III. Pharmaceutical Disparities: The Provider** ................................ 17
  - Summary ..................................................... 17
  - Suboptimal Prescribing in Specific Diseases........................................ 17
    - Asthma .................................................... 17
    - Psychiatric Illness .................................. 18
    - Cardiovascular Disease ......................... 22
    - Diabetes ............................................... 23
    - Pneumonia .............................................. 23
    - Acute Pain ............................................. 23
    - Osteoarthritis ........................................ 24
    - Cancer ................................................... 25
  - Cultural Sensitivity ................................. 25
    - Asian Americans .................................... 25
    - African Americans ................................. 26
    - Language .............................................. 26
Suboptimal pharmaceutical treatment of ethnic and racial minorities and socioeconomically disadvantaged persons is a major contributor to health-care disparities and unequal treatment in the United States. Factors operating at three levels—the health-care system, the provider, and the patient—contribute to disparities in medication use.

An important source of medication disparities is not having a pharmaceutical-benefit plan; another is having a plan that restricts access to needed medications. Even culturally competent providers cannot effectively prescribe for patients without medical insurance or with drug plans that limit access to medications.

Even when available through insurance plans, appropriate medications for a variety of diseases are disproportionately not prescribed for patients who are members of ethnic or racial minority groups or who are socioeconomically deprived.

Low patient literacy and poor communication skills of providers are important contributors to disparities in pharmaceutical treatment. Although prescription filling and consistent use of medications are often poor for all patient groups, adherence may be particularly challenging for minority and low-income patients. Elderly minority individuals may be at particular risk for suboptimal medication use.

Ethnic/racial differences in response to medications have been reported, and these differences should be considered when prescribing medications and dosages, constructing formularies and preferred-drug lists, and setting administrative procedures. Reports of different sensitivities to the actions and side effects of some drugs in minority populations indicate a need for well-designed clinical trials on effectiveness and optimal dosing of drugs in specific populations. Minority patients are willing to participate in clinical trials if they are educated about risks, benefits, and safeguards of modern drug-testing protocols.

Improving access and use of medications among patients who are members of ethnic or racial minority groups or who are socioeconomically deprived requires public policies and drug-insurance plans that enable affordable, personalized therapy. Also required are patient-education materials and provider-training programs that support effective prescribing and communication across cultural, socioeconomic, and educational differences.
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CHAPTER ORGANIZATION

Chapter I, Overview of Disparities in the Use of Pharmaceuticals, reviews studies that provide evidence of disparities in medication use in the United States by ethnic and racial minority groups but whose methodologies do not enable determination of whether the disparities originate in the health-care system, the provider, or the patient. Subsequent chapters review studies whose experimental designs enable more detailed analyses of the respective contributions of these factors.

Chapter II, Pharmaceutical Disparities: The Health-Care System, focuses on the role of the health-care system in fostering disparities in health insurance and on restrictive policies for prescription-drug coverage, primarily by Medicaid. Access to health care involving residential segregation along racial/ethnic and socioeconomic lines, which is an important feature of the US urban landscape, is also described in this chapter. Additional analysis in this chapter focuses on access to medical facilities and pharmacy services in geographic areas where minorities reside.

Chapter III, Pharmaceutical Disparities: The Provider, addresses disparities in pharmaceutical treatment that can be traced to the provider. Providers may follow suboptimal prescribing practices, i.e., prescribing patterns that do not follow recommended guidelines. This manifests usually as underprescribing, but also as overprescribing or misprescribing. Outcomes that measure the effects of prescribing practices include the numbers and types of written prescriptions for patient populations diagnosed with various illnesses. Suboptimal prescribing practices at the provider level may be due to lack of knowledge or to the provider’s beliefs about a particular minority group. In addition, the ability of the provider, usually a physician or pharmacist, to communicate and develop rapport with the patient also affects the patient’s use of medicines.

Chapter IV, Pharmaceutical Disparities: The Patient, examines characteristics of the patient that may help explain underuse of medicines by minorities. The measure of the use of medicine at the patient level is adherence, defined here as the extent to which the patient initiates or continues the agreed-upon mode of treatment. While nonadherence, or noncompliance, usually means underuse of medicines, it can also mean overuse or misuse. Nonadherence may be unintentional, or it may be intentional (e.g., a deliberate choice by the patient not to use a drug because of its cost or side effects or because of lack of understanding of its purpose). Outcomes used to quantify adherence include rates of prescription filling and rates of failure to use filled prescription medicines in accordance with instructions. Adherence rates are affected by patients’ cultural beliefs, health literacy, socioeconomic status, and ethnicity/race.

Chapter V, Ethic and Racial Differences in Response to Medications, discusses differences in drug response and side effects in ethnic and racial minorities. These differences may reflect environmental or genetic factors and should be considered in prescribing decisions and reimbursement policy, especially regarding drug formularies and preferred-drug lists.

Chapter VI, Recommendations for Reducing Disparities in Pharmaceutical Treatment, provides specific recommendations for policy makers, patient advocates, health-care-provider organizations, and medical educators.
EXECUTIVE SUMMARY

Although considerable research has documented ethnic, racial, and socioeconomic disparities in medication prescribing and adherence to treatment regimens, these studies previously have not been systematically compiled and organized. This review of the research reveals large-scale medication disparities across many of the important illnesses affecting minority groups. This finding should make medication disparities an important focal point for the many organizations now committed to the general goal of eliminating health-care disparities. A greater awareness of the extent of medication disparities may stimulate solutions and attract additional resources to address the problem. Recommendations for improving medication use in minority populations are offered for clinical practitioners, health-care organizations, and health-care-policy planners and advocates.

Evidence concerning the use of prescription medicines is often gathered in ways that preclude distinguishing among racial/ethnic differences in medication use that result from insurance issues, from physicians’ not writing prescriptions, or from patients’ not filling them or taking them correctly. Whatever the cause, evidence from such studies documents relatively greater underuse by racial/ethnic minorities (compared with the majority population) of prescription medicines for childhood asthma, depression, and hypertension, as well as lower influenza-vaccination rates in the elderly. Though these studies have not pinpointed the origins of the disparities, other studies have utilized methodologies that enable identification of the specific components—health-care-payment systems, providers, and patients—that drive differences in medication use by minorities and socioeconomically deprived populations.

ORIGINS OF PHARMACEUTICAL DISPARITIES

Although factors operating at the health-care-system, provider, and patient levels all contribute to disparities in medication use, a key origin of these disparities is a health-care system that tolerates reduced access to medications for minorities. Health-system disparities stem from a relative lack of health and drug insurance, aggressive cost containment in pharmacy-benefit plans serving minorities, and even reduced services at pharmacies in minority neighborhoods—all of which may limit access to medications or cause patients to reduce or discontinue therapy.

Significant amounts of data link disparities in the health-care-payment system to disparities in pharmaceutical treatment. A relatively greater percentage of minority individuals compared with whites lack health insurance, and studies have shown that those without health insurance are less likely to receive prescription medicines for depression and asthma and more likely to report that they take less medication because of cost.

Minorities who have prescription-drug insurance through Medicaid (which includes a disproportionate fraction of racial/ethnic minorities) may have reduced access to medications as a result of prescription-drug-cost-containment polices. These include prior authorization, mandatory use of generic drugs, preferred-drug lists, and limits on the number of prescriptions that will be reimbursed. These policies may in some cases limit necessary prescription-drug use, cause nonadherence to therapy, and increase the use of health-care services. The use of mandatory generic substitution and preferred-drug lists has been shown to increase the proportion of older drugs used by Medicaid recipients. Older generic agents may lack the technological advances built into newer products, may have a less-favorable therapeutic profile, and may have side effects that lead to nonadherence. Studies of the introduction of co-payment (payment of a fixed charge per prescription) by state Medicaid programs have found that that co-pays may inhibit prescription filling among low-income persons.
State Medicaid drug-formulary restrictions have been shown to have a spillover effect from Medicaid patients onto non-Medicaid minority populations in the same state. Presumably, physicians practicing in low-income areas where minorities live become accustomed to the restrictive prescribing practices imposed by Medicaid and apply them to their non-Medicaid patients as well.

Residents of largely African American and Hispanic neighborhoods face problems of access to health care and pharmacy services. Areas with high percentages of African American and/or Hispanic residents may present difficulties in obtaining prescriptions due to relative shortages of office-based primary-care physicians. Pharmacies in minority areas are much less likely to stock sufficient supplies of opioid analgesics, or they may not provide prescription labels in a native language for customers who are not proficient in English.

Even when appropriate medications are available through insurance programs, physicians may not prescribe them for minority patients. Substantial ethnic/racial disparities have been reported in the quality and quantity of medications prescribed in the treatment of major illnesses, including asthma, psychosis, cardiovascular disease, pain, and pneumonia. Disparities may result from inability of the prescriber to develop rapport with the patient, often due to differences in interactive style, and this may result in nonadherence to medication regimens.

Even when the appropriate medication is prescribed, it may not be taken correctly. Although medication adherence is generally low in all patient populations, studies have documented relatively poorer adherence by minorities being treated for asthma, depression, high cholesterol, and hypertension. Lower socioeconomic status is independently associated with poor adherence in studies of mental illness, cardiovascular drugs, and vaccination. Education and socioeconomic status explain much, but not all, of the low adherence by minorities.

Inappropriate use of medicines is associated with low health literacy. The health literacy of Hispanics and Asian Americans is lower than that of whites. More Hispanics and Asian Americans, compared with non-Hispanic whites, report difficulty in understanding a prescription bottle’s label. People whose primary spoken language at home is not English have lower health literacy, as do many of the elderly. Low health literacy has correlated strongly with improper use of metered-dose inhalers in studies of African Americans seeking emergency care for asthma. Among patients with diabetes, lower health literacy is associated with poorer control of blood sugar levels and higher rates of retinopathy.

Culture affects attitudes and beliefs about medicines and thus may influence adherence. However, cultural attributes of a group cannot be generalized to all individuals. Stereotypes should be avoided, because individuals vary greatly in their practices, beliefs, literacy level, and ability to communicate. The interaction with and treatment of patients must always be personalized. Immigrants from countries with non-Western medical traditions may have different expectations regarding drug therapy and strength of medications, they may fear addiction, and they may be unfamiliar with the concept of chronic disease. While people from other cultures may choose herbal preparations and other alternative medicines over conventional Western medicines, Hispanics and African Americans in the United States actually use alternative medicines less frequently than the non-Hispanic white majority.

Even when medication adherence is adequate, response to medications may differ among ethnic/racial groups. A growing body of research is uncovering differences among population groups in the metabolism, effectiveness, and side-effect profiles of many important drugs. As minorities experience more-severe or more-frequent side effects, they may stop taking medications at a greater rate. Failure to take these differences into account when prescribing or choosing dosages or when selecting agents for formularies or preferred-drug lists has the potential for suboptimal treatment and for enhancing disparities.

East Asians often require lower doses of some psychotropic drugs and have more side effects, and they are likely to have reduced adherence if the prescribed dosages of psychotropic medications are based on the standards for white patients. Hispanics
may require lower doses and may be more prone to side effects at normal doses of antidepressants. Hispanics also tend to require lower doses of antipsychotic medications. Differences among African Americans, Asians, and whites in adverse reactions to cardiovascular medications have been reported.

Some differences in responses to drugs appear to have a genetic origin. There are ethnic/racial differences in the frequencies of many of the genes that control drug-metabolism rates and hence the effective dose received. In addition, variations in genes encoding drug-receptor proteins may alter sensitivity to a drug’s effect, and some differences in drug response among ethnic/racial groups appear to be related to such genetic variations. Studies have reported gene-linked variability across ethnic/racial groups in response to medicines used in the treatment of cancer, asthma, and congestive heart failure.

**RECOMMENDATIONS FOR REDUCING PHARMACEUTICAL DISPARITIES**

The pharmaceutical-benefit plans associated with Medicaid and Medicare currently provide many minority and disadvantaged populations with needed access to pharmaceuticals. To solidify and sustain these benefits, policy makers should take care not to undermine the effectiveness of the benefits by raising cost-sharing for low-income minority groups to levels that represent a barrier to filling prescriptions. Policy makers should also be wary of approaches to managing drug utilization that overly restrict the range of available drugs. Such approaches include policies that aggressively favor prescribing medications that are available as generics, which tend to be older and less technologically advanced agents. Agents shown to be particularly effective for minorities should be available to them through insurance programs.

Differences in metabolic pathways among drugs of a class, coupled with ethnic/racial differences in frequency of gene variation in these pathways, call for caution in the implementation of drug-substitution policies. Drug switching may cause problems in cases where the correct dose is difficult to predict, and minority patients have a greater chance of metabolism or responsiveness different from that of whites. Switching introduces an additional variable into predicting therapeutic outcome in any patient, and this may be further complicated by superimposing the additional variable of minority status.

The existence of numerous racial/ethnic variations in drug metabolism and drug sensitivity underscores the need for individualized prescribing and dosing, and the potential for variations should be an important consideration in determining the range of available therapeutic choices on drug formularies and preferred-drug lists. Until individualized genetic profiles of patients become a clinical and economic reality, ethnic/racial background—like other categories, such as age and gender—should be considered when selecting drugs and adjusting dosages.

Minority-advocacy organizations should monitor insurance plans for policies having the potential to create disparities. Advocates should encourage enrollment in Medicare Part D to relieve the cost burden on low-income minority elderly people.

Health-care organizations should educate staff about the health beliefs and cultural norms of ethnic/racial and socioeconomic groups, especially regarding how those beliefs affect the use of pharmaceuticals. Managed-care and disease-management organizations should design care regimens and protocols that address the needs of minority patients. Health-care organizations should also provide patient-education programs and interventions that increase patients’ skills and confidence in managing and assessing medication-related health problems. Patients should be educated about how to communicate with their providers and encouraged to become more active partners in their health care. Medical educators should include medication-adherence modules in cultural-competency programs, and clinicians should incorporate cultural, psychological, and lifestyle factors into personalized, evidence-based therapy for minority individuals. Public-health campaigns should educate patients about proper medication use and specifically address misperceptions about the importance of treatment adherence.
Since the percentages of persons from ethnic/racial minority groups who metabolize certain drugs more slowly may differ from those of the majority population, dosage adjustments or prescribing of alternate agents may be required. Personalized drug therapy based on genetic testing is preferable to crude estimates of the likelihood of different metabolism based on self-reported racial/ethnic category. As testing for drug-metabolism gene variants becomes more common, prescribers should consider using these tests to help avoid or anticipate dosing errors and untoward reactions in minority patients.

Health-care organizations should collect and stratify data about disparities in pharmaceutical treatment and outcomes by race, ethnicity, and language and integrate this information into ongoing quality-improvement, patient-safety, and disparities-reduction efforts. The Agency for Healthcare Research and Quality’s quality-of-care measures that relate to drug treatment may be used to track disparities in pharmaceutical care.

Racial/ethnic minority groups have been historically underrepresented in clinical trials. Research is needed to clarify the factors that prevent and facilitate participation in trials of new medications. However, surveys report that African Americans and Hispanics are as willing as non-Hispanic whites to participate in biomedical research when they are made aware of studies and the studies meet their medical requirements. Patients’ trust has been found to increase when personal physicians are involved in the clinical trial and details of the trial are provided. Minority patients have participated in clinical trials when they are made aware of the purpose of the trial and understand the value of participating.
CHAPTER I. OVERVIEW OF DISPARITIES IN THE USE OF PHARMACEUTICALS

SUMMARY
Disparities in the use of medicines by specific populations may originate in the characteristics of the health-care system, the prescribing behavior of providers, or the cultural and socioeconomic characteristics of the patients. Accordingly, racial and ethnic disparities may be the result of health-insurance restrictions, physicians’ habits or biases in writing prescriptions, or patients’ not filling prescriptions or not following the directions for prescription usage. A great deal of published articles’ evidence related to the use of prescription medicines in minorities is gathered in ways that make it difficult or impossible to ascertain the origins of observed disparities. Although many of these articles report disparities, but do not specify their origins, they provide considerable evidence that medications are underused among African American and Hispanic populations to a greater extent than among the white population. Examples of this differential underuse have been reported for medications used to treat asthma, depression, hypertension, and influenza. Many other studies documenting disparities use methodologies that enable identification of the origins of the disparities, and these are discussed in subsequent chapters.

DISPARITIES IN USE OF MEDICATIONS
A health disparity is defined by the Health Resources and Services Administration as “a population-specific difference in the presence of a disease, health outcome or access to care.” Ethnic and racial minorities—particularly African Americans, Hispanics, and Native Americans—and underserved groups, such as the socioeconomically disadvantaged, have a greater burden of illness and risk of death than the rest of the US population. The most striking health disparities include shorter life expectancy and higher rates of cardiovascular disease, cancer, asthma, diabetes, and mental illness. Such disparities—resulting from complex interactions among biology, the environment, socioeconomic status, individual health behaviors, and the health-care system—persist despite continuing improvements in minority health.

Disparities in the use of medicines by a specific population may be attributed to the characteristics of the health-care system, the provider, and the patient (Figure 1). These components often interact. For example, the ability of the provider to communicate and develop rapport with ethnically diverse patient populations depends in part on each patient’s level of health literacy.

FIGURE 1. Origins of medication disparities. Characteristics of the health-care system, the provider, and the patient cause disparities in the use of medications by minority populations. To complicate matters, these factors often interact.

However, while provider and patient factors contribute to disparities in medication use, a fundamental cause of disparities is a health-care system that tolerates reduced access to medications. Even culturally competent providers cannot effectively prescribe for patients who do not have medical insurance or whose drug plans’ benefit
designs impede prescribing of optimal medications. Even motivated and well-informed patients will not fill or refill prescriptions if they cannot afford them.

To reduce medication disparities, equal access to health-care services must be provided to all patients. This report specifically addresses medicines and population-specific barriers to treatment with medication (“medicines” and “medication” refer to prescription drugs for the most part, but the terms also include nonprescription drugs and alternative therapies, such as folk medicines). This review’s focus on the findings that contribute to disparities in the use of medications is intended to increase understanding of how inequalities may be reduced.

The role of the health-care system and restrictive insurance policies for prescription coverage, especially by Medicaid, is also elucidated in this report. The Medicaid population is, by definition, socioeconomically disadvantaged and includes a disproportionate number of ethnic and racial minorities. The percentage of African Americans and Hispanics in the Medicaid population (48%) is almost twice as large as in the general US population (25%).

Restrictions by insurance companies in coverage for medications include prior authorization, generic substitution, caps on the number of prescriptions allowed for reimbursement, and cost-sharing requirements (particularly co-payments).

The racial/ethnic profile of the Medicare population differs from that of the Medicaid population. According to the National Hispanic Medical Association, as of 2006 Hispanics had lower enrollment rates in Medicare than African Americans and whites. Currently there is insufficient information on the Medicare Part D prescription-drug-benefit plan to know if it exerts discriminatory effects on disadvantaged groups. However, inferences about Medicare Part D may be made by comparing earlier studies of Medicare and Medicare+Choice plans that included prescription-drug coverage. In particular, one subgroup of Medicare beneficiaries, the “dual eligibles” (those enrolled both in Medicare, because they are old or disabled, and in Medicaid because they have low incomes), comprise disproportionately large numbers of minority-group members. Minorities constitute 43% of duals, whereas they constitute 16% of the overall Medicare population. This vulnerable population is at particular risk for unintended consequences of pharmaceutical-benefit designs that may compromise treatment outcomes.

Numerous research reports document ethnic and racial disparities in the use of medications in the United States. The research designs and databases used in many of these reports allow clear distinctions regarding the level at which the disparity in medication use occurs, i.e., the health-care system, the provider, or the patient. Other reports documenting disparities in medication use cannot make these types of distinctions. For example, it may not be possible to determine whether a prescription was written and not filled or simply was not written in the first place. Similarly, it is sometimes not possible to tell from a study design if a medication was or was not available within the patient’s insurance plan.

The studies described in this chapter, which all contain such limitations, collectively document extensive disparities in the use of medications in many common and debilitating diseases, even if the ultimate sources of the disparities are not clear. Subsequent chapters discuss reports whose methodologies enable identification of the level—the health system, the provider, or the patient—at which a disparity occurs.

**DISPARITIES IN USE OF MEDICATIONS FOR SPECIFIC DISEASES**

Minorities receive less-intensive pharmaceutical treatment for many illnesses compared with the nation as a whole. A 1991 study of youths 5 to 14 years of age in Maryland examined Medicaid prescription claims. Compared with whites, African Americans were 39% to 52% as likely to have a prescription for a psychotropic medication and 60% to 87% as likely to have a prescription for a non-psychopharmacological agent, i.e., antibiotic, skin preparation, antitussive, antihistamine, or eye, ear, nose, and throat medications.
The reports discussed below document that racial/ethnic minorities often (but not always) receive fewer asthma medications, antidepressants, antihypertensive agents, antidiabetic drugs, antiretrovirals, and vaccinations for influenza and pneumonia.

Asthma

Guidelines from the National Asthma Education and Prevention Program recommend regular use of maintenance (long-term control) medications, such as inhaled anti-inflammatory drugs, by people with persistent asthma. Studies have reported underuse (defined as less use than recommended in the National Asthma Education and Prevention Program guidelines) of long-term-control medications for specific minority groups (Figure 2, Table 1). Early studies examined asthma-maintenance medication use in children attending the emergency room or admitted to the hospital because of an acute asthma attack.

A 1994 study of children attending an inner-city hospital for an acute asthma attack found that only 27% used asthma-maintenance therapy (cromolyn, theophylline, or corticosteroids). Forty-two percent of the children in this study were black or Hispanic. In the National Cooperative Inner-City Asthma Study, in which almost all of the children were either African American or Hispanic, one-quarter of the children with severe asthma did not use long-term-control medications. In a later survey of inner-city children previously hospitalized for asthma, only 39% of those who met National Asthma Education and Prevention Program symptom criteria for persistent asthma (and who therefore should have received daily anti-inflammatory medication according to the program’s guidelines) actually received daily anti-inflammatory drug treatment; further, only 15% of children with symptoms of moderate-to-severe persistent asthma were receiving inhaled corticosteroids (recommended in National Asthma Education and Prevention Program guidelines). Several community-based studies of children with asthma documented similar underuse of long-term-control medications. A study of low-income, inner-city African American children in Baltimore, Maryland, and Washington, DC, found that only 12% had used inhaled anti-inflammatory medications for their asthma in the past six months. And in a 1997 survey of predominantly Puerto Rican and African American children with current asthma in East Harlem, New York, only 22% used a daily anti-inflammatory medication (inhaled corticosteroid or cromolyn); even among the subset with severe asthma, only 39% used a daily anti-inflammatory agent.

Some of studies in Table 1 did not compare minority populations with non-Hispanic white populations and therefore did not demonstrate disparities in asthma treatment. However, other studies did include a reference (white) patient group and showed disparities between the minority and white groups. Most of the evidence showing disparities in asthma was from studies of childhood asthma in Medicaid programs:

- The asthma medications commonly used by inner-city children in Connecticut and Massachusetts from 1996 to 1998 were documented in the Childhood Asthma Severity Study. Inhaled corticosteroids had been used in the past year by 12% of African American children and 6% of Hispanic children (93% of whom were of Puerto Rican descent), whereas they had been used by 27% of white children—a white/nonwhite disparity of 15 to 21 percentage points. African American and Hispanic children were 60% and 70%, respectively, less likely than white children with similar insurance and sociodemographic characteristics to be using inhaled corticosteroids.

- In a 1995–97 study of the Tennessee Medicaid Program, African American children were 33% to 38% less likely than other children to have an oral-corticosteroid prescription filled after an emergency-room visit or hospitalization due to asthma. Among other children, 53.7% (versus 33.9% of African American children) filled such prescriptions after an emergency-room visit and 64% (versus 47% of African American children) filled such prescriptions after hospitalization.

- In the 1999 Asthma Care Quality Assessment Study of Medicaid-insured children with asthma, African American and Hispanic ethnicity/race was associated with an approximate doubling of the likelihood of underuse of long-term-control...
origins and strategies for addressing ethnic and racial disparities in pharmaceutical therapy

medications for persistent asthma when compared with white children with similar socioeconomic, health-plan, and asthma status. Underuse of controller medications was reported for 75% of African American, 79% of Hispanic, and 69% of white children—a white/nonwhite disparity of 6 to 10 percentage points.

A 1993–4 study of children enrolled in the non-health-maintenance-organization portion of the Massachusetts Medicaid Program examined disparities in appropriate asthma pharmacotherapy. Hispanic children received far fewer asthma-related medications than any other group. Hispanic children had approximately half as many annual filled prescriptions for inhaled anti-inflammatory medications as white children; the number of anti-inflammatory medications received by African American children was intermediate between the numbers received by Hispanic and white children.

In a 1996 study of adults with asthma enrolled in a California health-maintenance organization, African Americans and Hispanics were 59% and 30%, respectively, less likely than non-Hispanic whites to use daily inhaled corticosteroids.

Not all studies have found disparities in the treatment of children with asthma. A 1988–92 study of a Medicaid population reported that African American and white children were equally likely to have filled prescriptions for asthma medications. Mixed results were reported from a 1993–4 study of children enrolled in the non-health-maintenance-organization portion of the Massachusetts Medicaid Program. There were differences in receipt of at least a three-month supply of a β-agonist (a process-of-care measure based on 1991 national guidelines); African American children were as likely as white children to receive adequate amounts of β-agonists, but Hispanic children were 27% less likely to receive

**FIGURE 2.** Underuse of childhood asthma medications correlates with race/ethnicity, socioeconomic status, and access to routine care. In the 1999 Asthma Care Quality Assessment Study of Medicaid-insured children, underuse of long-term-control medications was more likely if the child was African American (black) or Hispanic (as opposed to white). The underuse of these medications was less likely if the parent had some college education or if the child received routine asthma care (i.e., if the child had a primary-care physician, had received a written asthma action plan, or had a follow-up visit). Adapted from Ethnic Disparities in the Burden and Treatment of Asthma (Asthma and Allergy Foundation of America and the National Pharmaceutical Council, 2005). “White” is the reference for black and Hispanic minority status. The reference for “college education” is families in which the parent had graduated from high school but had not been to college. “Received written action plan” and “had follow-up visit” refer to the six months before the interview. All odds ratios shown in this figure were significantly different from 1.0, the point of equal likelihood.
<table>
<thead>
<tr>
<th>Study</th>
<th>Subjects</th>
<th>Setting</th>
<th>Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jonathan A. Finkelstein, Randall W. Brown, Lynda C. Schneider, et al, “Quality of Care for Preschool Children with Asthma: The Role of Social Factors and Practice Setting,” <em>Pediatrics</em> 95, no. 3 (1995): 389–394</td>
<td>Preschool pediatric inpatients</td>
<td>Hospital</td>
<td>African American and Hispanic children were less likely than white children to have taken anti-inflammatory medications before admission and less likely to be discharged home with a nebulizer</td>
</tr>
<tr>
<td>William O. Cooper and Gerald B. Hickson, “Corticosteroid Prescription Filling for Children Covered by Medicaid Following an Emergency Department Visit or a Hospitalization for Asthma,” <em>Archives of Pediatrics and Adolescent Medicine</em> 155, no. 10 (2001): 1111–1115</td>
<td>African American children</td>
<td>Tennessee Medicaid program</td>
<td>African American children were 33% to 38% less likely than white children to have an oral-corticosteroid prescription filled after an emergency-room visit or hospitalization</td>
</tr>
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<td>Alexandra E. Shields, Catherine Comstock, and Kevin B. Weiss, “Variations in Asthma Care by Race/Ethnicity among Children Enrolled in a State Medicaid Program,” <em>Pediatrics</em> 113, no. 3 (2004): 496–504</td>
<td>Children with asthma</td>
<td>Massachusetts Medicaid program†</td>
<td>African American and Hispanic children received fewer inhaled-corticosteroid prescriptions than white children</td>
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Adapted from *Ethnic Disparities in the Burden and Treatment of Asthma* (Asthma and Allergy Foundation of America and National Pharmaceutical Council, 2005).

*These studies showed underuse of asthma maintenance medications by minority children, but did not compare different racial/ethnic groups.

†Non-health-maintenance-organization portion.
them. Among children who did receive at least three-month supply of a β-agonist, there were no racial/ethnic disparities in the rates of receipt of anti-inflammatory medications after accounting for imbalances in age, gender, provider, and region.16

In some cases, factors other than ethnicity/race may underlie observed differences in asthma care. A study of preschool children hospitalized with asthma found that the observed differences in medication usage among African American, Hispanic, and white children essentially disappeared when each patient’s primary-care-practice type was taken into consideration. Private-practice patients were more likely to have taken anti-inflammatory medications before admission than patients whose primary-care practice was a neighborhood health center or a hospital-based clinic.17

**Depression**

Minorities have been reported to have low rates of antidepressant-medication use. For example, in a 2000–2001 survey of a population-based sample of middle-aged African Americans residing in St. Louis, Missouri, only 20% of subjects with clinically relevant levels of depressive symptoms were currently taking antidepressants.18 Numerous studies have reported that African Americans, Asians, and Hispanics, in general, have lower rates of antidepressant management compared with non-Hispanic whites:

- National-survey data for 1992–3 and 1994–5 indicate that the rate of office-based visits documenting antidepressant pharmacotherapy, a diagnosis of a depressive disorder, or both was comparable among African Americans and Hispanics, but less than half the rate for non-Hispanic whites.19 In this case the results appear to reflect a white/nonwhite disparity in rates of diagnosis of depression.

- In a community-based survey of 1,540 elderly subjects interviewed in five North Carolina counties from 1992 to 1997, African Americans were only about one-third as likely as whites to have used antidepressants. These differences were interpreted as undertreatment of African Americans, since the prevalence of depression did not vary by race.20

- After adjusting for other factors, an analysis of patients with a diagnosis of depression identified in a 1989–94 state Medicaid database found that African Americans were about half as likely as whites to receive any antidepressant medication. Forty-four percent of white patients and 28% of African American patients received an antidepressant at the time of the initial diagnosis of depression. African Americans were also significantly less likely than white patients to receive a selective serotonin-reuptake inhibitor. Data indicated that selective serotonin-reuptake inhibitors were used by 0.9% of African American and 7.0% of white patients.21

- A 1999 study of Medicare+Choice plans showed that elderly African Americans, Hispanics, and Asians had lower rates of antidepressant use than elderly non-Hispanic whites for newly diagnosed episodes of depression. African Americans and Asians had lower rates of antidepressant treatment than elderly whites during acute-phase therapy. The 12-week acute-phase course of antidepressants was completed by 41% of Asian, 48% of African American, 57.6% of Hispanic, and 60% of white patients. African Americans, Asians, and Hispanics also had lower rates of antidepressant use than non-Hispanic whites during the continuation phase of therapy.22

**Cardiovascular Disease**

A 1992 national survey of adults 51 to 61 years of age with a self-reported history of hypertension, found that 73% of African Americans, 52% of Hispanics, and 64% of whites reported current use of antihypertensive medications.23 A 1993–4 population-based survey of elderly Mexican Americans residing in five southwestern states found that only 51% of those with hypertension were taking antihypertensive medications.24 About one-third (37%) of those with hypertension were unaware of their diagnosis (diagnosis of hypertension was based on blood-pressure measurements, review of medications, and an in-home interview).25 More recent national-survey data for 1999 to 2002 indicate that only 42% of Mexican American adults with hypertension reported using an antihypertensive medication in
the past month and 65% of African Americans and 65% of non-Hispanic whites were currently using antihypertensive medications.26

A study of elderly adults residing in Galveston County, Texas, found that 62.9% of non-Hispanic whites, 60.2% of blacks, and 45.2% of Hispanics with hypertension were on antihypertensive medications. After adjusting for age, gender, years of education, household income, Medicaid insurance, number of physician visits, and cognitive function, Hispanic ethnicity, unlike black ethnicity, remained significantly associated with lower use of antihypertensive drugs compared with non-Hispanic whites.27

The use of lipid-lowering drugs was investigated in a 1993–8 study of nonelderly Ohio Medicaid recipients with cardiovascular disease. Compared with whites, minorities (primarily African Americans) were less likely to have used lipid-lowering drugs previously, to have received a new prescription, or to have continued using this type of medication.28

HIV/AIDS

Data for 1997 to 1998 from a national survey of adults with HIV/AIDS indicate disparities in the receipt of antiretroviral drugs, including protease inhibitors and nonnucleoside reverse transcriptase inhibitors. After adjusting for CD4-cell counts, the risk of not receiving these drugs was approximately doubled for those with less education (less than 12 years versus 16 or more years), for those with no insurance or Medicaid, and for African Americans versus whites.29 As of 2002 this disparity seems to have disappeared; no significant racial/ethnic disparities were found in the proportion of HIV patients who received prophylactic therapy for Pneumocystis and Mycobacterium avium infections.30

Influenza and Pneumonia Vaccinations

Minorities have been reported to have relatively lower rates of influenza and pneumonia vaccinations than whites (Figure 3).

VACCINATION RECEIVED DURING PAST 12 MONTHS

FIGURE 3: Receipt of influenza and pneumococcal vaccinations correlates with race/ethnicity. Results of the 2005 National Health Interview Survey for the elderly (65 years and over) indicate that Hispanic persons and non-Hispanic black persons (African Americans) were less likely than non-Hispanic white persons to have received an influenza or pneumococcal vaccination during the past 12 months. Adapted from Early Release of Selected Estimates Based on Data from the January–September 2005 National Health Interview Survey (National Center for Health Statistics, Centers for Disease Control and Prevention, March 31, 2006), http://www.cdc.gov/nchs/about/major/nhis/released200603.htm#4 (accessed 2 July 2008).

Influenza

Racial and ethnic disparities in influenza-vaccination rates are well documented in national surveys of the elderly (65 years and older). Analyses of the 1996 Medicare Current Beneficiary Survey, which covers community-dwelling Medicare beneficiaries, indicated that African, Hispanic, and Asian Americans received fewer influenza vaccinations than the white majority. Influenza vaccination rates for these groups were 43%, 49%, 56%, and 65%, respectively. Cost did not seem to be a factor, as influenza vaccination for the elderly was covered by Medicare at that time.31

Telephone surveys of patients tracked in two national studies of the elderly from 1992 to 2000 indicated that the proportion of patients
immunized with influenza vaccine in the previous two years was 10% to 20% higher among white than among African American elderly.\textsuperscript{32} Data from the 2001 National Health Interview Survey indicate that the influenza vaccination rate for the elderly was 68% among whites, 55% among Hispanics, and 50% among African Americans.\textsuperscript{33} The racial disparities found in the above influenza vaccination rates from the national telephone surveys of the elderly from 1992 to 2000 could not be explained by differences in socioeconomic status, health, or health-care-related variables.\textsuperscript{34}

Recent data indicate persistence of disparities in national vaccination rates for the elderly. Data from the 2005 National Health Interview Survey for adults aged 65 years and over indicate that Hispanics and African Americans were less likely than non-Hispanic whites to have received an influenza vaccination during the past 12 months. The percentages of persons receiving an influenza vaccination during the past 12 months were 42% for Hispanics, 41% for African Americans, and 63% for non-Hispanic whites.\textsuperscript{35}

Racial and ethnic disparities in influenza-vaccination rates also have been reported in national surveys of the nonelderly. In a 1996–7 telephone survey of a nationally representative sample of nonelderly adults with private or Medicaid health insurance, English-speaking Hispanics were as likely as non-Hispanic whites to have received an influenza vaccination in the past year, but Spanish-speaking Hispanics were only about one-third as likely as non-Hispanic whites to have received an influenza vaccination. Nonelderly African American adults with Medicare or private health care were also significantly less likely than whites to have received an influenza vaccination.\textsuperscript{36}

Studies of the Tennessee elderly have displayed the nationwide pattern of disparities. A 2001 telephone survey of a random sample of residences in Nashville and Davidson County used an adapted version of the Centers for Disease Control and Prevention’s Behavioral Risk Factor Surveillance System.\textsuperscript{37} Overall, African Americans and whites were equally likely to have received an influenza vaccination. However, differences were found among the elderly. Older African Americans were less likely to have been vaccinated than whites (57% versus 70%).\textsuperscript{37} A random telephone survey of Tennessee residents conducted in 2004 showed that nonwhite race was predictive of not being vaccinated for influenza. White residents were 1.5 times more likely than nonwhite residents to have received an influenza vaccination.\textsuperscript{38}

**Pneumonia**

Data from the 2003 National Health Interview Survey indicate that among adults 65 years and older, rates of pneumococcal vaccination approximated 50% for non-Hispanic whites, 35% for African Americans and Asians, and 30% for Hispanics.\textsuperscript{39} Analyses of data from a 1998 national household survey indicated that race/ethnicity remained an independent predictor of pneumococcal vaccination after correcting for differences in age, access to care, health-insurance coverage, and socioeconomic status—with vaccination rates being higher for non-Hispanic whites than for African Americans or Hispanics.\textsuperscript{40}

Rates of vaccination were lower for the poor and those with less-than-high-school education than for the better-off or better-educated population. African Americans and Hispanics at all levels of education and income were less likely to report ever having a pneumococcal vaccination than were non-Hispanic whites. Socioeconomic status and lack of access to care were part of the explanation, but race and ethnicity were independently associated with disparities in vaccination rates.\textsuperscript{41}

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*The Behavioral Risk Factor Surveillance System is an ongoing data-collecting system that develops and conducts surveys to monitor state-level prevalence of health behaviors associated with morbidity and mortality. The goal of the system is to collect data on actual behaviors, as opposed to attitudes or knowledge that would be useful for planning, initiating, and evaluating health-promotion and disease-prevention programs. (See the Centers for Disease Control and Prevention Web site: http://www.cdc.gov/BRFSS/about.htm.)*
CHAPTER II. PHARMACEUTICAL DISPARITIES: THE HEALTH-CARE SYSTEM

SUMMARY
While the health-care system, the provider, and the patient all contribute to disparities in medication use, a fundamental cause of these disparities is a health-care system that tolerates reduced access to medications. Health-system disparities stem from a relative lack of health- and drug-insurance coverage, aggressive cost containment in pharmacy-benefit plans, and reduced services at pharmacies in minority neighborhoods. All of these situations may limit access to medications or cause patients to reduce or discontinue therapy.

Medicaid, the safety net for prescription-drug use for socioeconomically disadvantaged persons, includes a disproportionate fraction of racial/ethnic minorities. Most Medicaid enrollees live in states with prescription-drug-cost-containment polices—prior authorization, generic substitution, preferred-drug lists, co-payments, and caps. While fulfilling their intent to save drug costs, these policies may have the unintended consequence of limiting access to necessary medications. This limitation has in some cases been associated with increased utilization of medical services.

Any disparities created by restrictive policies for Medicaid patients may have a spillover effect onto the non-Medicaid minority population, since minority patients are more likely than whites to reside in an area where Medicaid prescribing patterns are the norm.

Under the Medicare Part D Program, dually eligible Medicaid recipients receive their drug benefits from Medicare. The dually eligible are disproportionately members of minority groups (duals are 43% minorities, whereas other Medicare recipients are 16% minorities). On the whole, Medicare Part D is likely to expand access to medications by minority populations. However, compared with other Medicare enrollees, duals may be at greater risk of suboptimal therapy since they are poorer and sicker and have more mental illness and dementia and less education. As drug-utilization-management policies in Medicare Part D evolve, care must be taken to avoid unintended consequences.

MEDICATION DISPARITIES DUE TO LACK OF INSURANCE
National- and state-survey data indicate a substantial gap in health-insurance coverage. National survey data for 1997 indicate that Hispanics and American Indians/Alaska Natives were more than twice as likely as whites to lack health care coverage. The median percentage of respondents who were uninsured was 11% for non-Hispanic whites, 16% for African Americans, 23% for Hispanics, 25% for American Indians/Alaska Natives, and 14% for Asians/Pacific Islanders. More recent data indicate that these disparities persist (Figure 4). A state study of New Jersey families with children with asthma or related respiratory problems found that, as of 2001, 35% of Mexican families had no health insurance, whereas 7% of African American and 5% of white families had none. Mexican families were less likely to have health insurance than other Hispanic subgroups. For other Hispanic groups, 12% to 22% of families of Puerto Rican, Colombian, Dominican, Peruvian, or other Hispanic origin had no health insurance. In addition, 16% of Asians had no health insurance.

National and state surveys have documented relationships between possession of health insurance and prescription-drug use. Studies have shown that those without health insurance
are less likely to receive prescription medicines for depression and asthma and are less likely to take medication because of cost. A 1998 analysis of national-survey data explored the association between insurance status and receipt of prescriptions by patients with mental illness. Patients having private insurance were twice as likely as self-paying patients to receive an antidepressant prescription. A 2003 study found that Hispanic children with health insurance were 1.5 to 3.0 times more likely than those without health insurance to use asthma medications between 1998 and 2001.

The Health and Retirement Study, an ongoing national survey of community-dwelling older Americans, has examined the relationship between insurance status and prescription drug use. A striking association was found between cost-related underuse of medications and both income level and out-of-pocket spending for drugs (Figure 5). Among over 10,000 participants interviewed in 2000, 12% of those with no prescription-drug coverage reported having taken less medication in the past two years than prescribed because of cost, whereas 5% of those with partial coverage and 3% of those with full prescription coverage had taken less because of cost.

FIGURE 4. Racial/ethnic gaps in possession of health insurance. These results of the 2005 National Health Interview Survey show that Hispanics were more likely to be without health insurance coverage than African American (black) or white respondents and that African Americans were more likely to be without health insurance than whites. Adapted from Early Release of Selected Estimates Based on Data from the January–September 2005 National Health Interview Survey (National Center for Health Statistics, Centers for Disease Control and Prevention, March 31, 2006), http://www.cdc.gov/nchs/about/major/nhis/released200603.htm#4 (accessed 2 July 2008).

FIGURE 5: Poor medication adherence by Medicare recipients correlates with income level and out-of-pocket spending. In this household survey during the year 2000, there was a striking association between cost-related poor medication adherence and both income level and out-of-pocket spending for drugs. Cost-related poor medication adherence was defined in this study as the respondent’s reporting having taken less medication than prescribed in the past two years because of cost. Adapted from Ramin Mojtabai and Mark Olfson, “Medication Costs, Adherence, and Health Outcomes among Medicare Beneficiaries,” Health Affairs 22, no 4 (2003): 220-229.
MEDICATION DISPARITIES DUE TO PHARMACEUTICAL-COST-CONTAINMENT POLICIES

Pharmaceutical-policy restrictions may be divided into three broad categories: (1) restrictions that aim to limit drug use, either by administrative or financial means, such as prior authorization or a cap on the number of prescriptions reimbursed; (2) restrictions that channel drug use into less-expensive categories, such as generic substitution or preferred-drug lists; and (3) restrictions that shift part of the cost burden onto the patient, such as co-payments and deductibles.

State Medicaid policies were profiled in the 2003 Community Tracking Study, a household survey of randomly selected communities in 34 states and the District of Columbia. Most adult Medicaid enrollees lived in states with prescription-drug-cost-containment policies. Seventy-nine percent of these enrollees lived in states where prior authorization was required; 59%, in states requiring generic substitution; 69%, in states requiring co-payments; and 56%, in states with prescription-drug caps. Except for co-payments, all of these restrictive state policies had increased in frequency since 2000, and the proportion of Medicaid enrollees living in states with all four types of restrictive policies had tripled, to about 52%. Enrollees in states that implemented all or almost all of the cost-containment policies reported having greater problems obtaining prescription drugs compared with enrollees in other states.47

Any disparities created by Medicaid drug restrictions may have a spillover effect onto the non-Medicaid minority population, since minority patients are more likely than whites to reside in a geographic area where Medicaid prescribing rules are the norm (see “Preferred-Drug Lists,” below).48

Prior Authorization

The 2003 Community Tracking Study found that prior authorization—requiring pharmacists to obtain approval from the state (or a subcontractor) before dispensing a drug—had the largest effect on access to prescription drugs of any of the restrictive polices. Prior-authorization requirements increased the probability of prescription-drug-access problems by 20% (a “drug-access problem” meant that in the past year the respondent had needed, but had been unable to afford, prescription medicines).49

Medication Caps

Placing a limit on the number of prescriptions reimbursed per month is known as capping. Studies in the 1980s and 1990s showed that the introduction of caps in a Medicaid population decreased the use of some, though not all, categories of prescription drugs. In New Hampshire, Soumerai and colleagues examined the effects of a three-prescription monthly cap on the use of psychotropic drugs. The introduction of the cap resulted in immediate reductions of 15% to 49% in the use of antipsychotic drugs, antidepressants, lithium, and anxiolytic and hypnotic drugs. There were concomitant increases in the use of emergency-mental-health services that offset any savings in the drug budget. These changes did not occur in New Jersey, a control state, and were reversed when the New Hampshire cap was discontinued.50

A study of the effects of the New Hampshire caps on persons thought to be most at risk for reduced access to essential medications looked at community-dwelling individuals with multiple chronic illnesses requiring drug therapy, especially illnesses with a mental-health component. The standard monthly doses of medications for important conditions—including pain, bipolar disorder, schizophrenia, and anxiety or sleep problems—all decreased by an average of one-third after the cap was implemented.51

In 1991, the Georgia Medicaid Program changed a six-prescription plan to a five-prescription limit. After this change, total prescription use fell by 6.6%, prescriptions reimbursed by Medicaid fell by 9.9%, and prescriptions paid for out of pocket increased by 9.7%. Abrupt, permanent decreases were observed for cardiovascular, miscellaneous, pulmonary, and palliative therapeutic-drug categories. Gastrointestinal–, chemotherapy–, hormone (insulin)–, and central-nervous-system–prescription use remained constant.52
Before the introduction of Medicare Part D in 2006, prescription-drug coverage for the elderly (65 years and over) was provided by Medicare+Choice plans or by private insurers. Many Medicare+Choice plans implemented caps on annual prescription-drug benefits. A study of 2003 data from Northern California was used to compare Medicare+Choice beneficiaries whose annual drug benefits were capped at $1,000 with beneficiaries without caps due to employer supplements. This study found that those whose benefits were capped were more likely to be nonadherent to long-term drug therapy. For instance, nonadherence to antidiabetic drugs was 21% among those without a cap and 26% among those with a cap. The study’s authors concluded that the capping policy was discriminatory, since those with capped benefits were more likely to reside in a low-socioeconomic-status neighborhood than those whose benefits were not capped (19% versus 15%). These authors also suggested that this information may help us understand the effect of the new Medicare Part D drug plans, in which many patients paid in full for annual drug costs between $2,250 and $5,100.

**Generics**

The effect of a generic-drug-substitution policy was investigated in a 1996 study of community pharmacies in a midwestern state. Pharmacists substituted 84% of prescriptions that could be generically substituted. Prescriptions covered by Medicaid were about five times more likely to be generically substituted than prescriptions covered by private third-party and indemnity insurance or prescriptions paid for out of pocket by the uninsured. This was attributed to the mandatory-generic-substitution policy.

In the 2003 Community Tracking Study, mandatory-generic-substitution policies increased the probability of prescription-drug-access problems (being unable to afford a needed medication) by about 8%. The author stated, “That mandatory generic requirements would lead to higher reports of access problems may also be surprising, since they do not imply a cost to the enrollee.” The author speculated that physicians not realizing that they could substitute generics or patients’ demanding brand-name drugs for which they might have to pay full price were potential access issues. Further, the author also described how the “high levels of access problems reflect in large part Medicaid enrollees’ much lower incomes and higher prevalence of chronic conditions.” He suggested that policy makers examine these cost-containment policies to see if they were inadvertently restricting access to needed medications through bureaucratic obstacles or through lack of awareness among Medicaid enrollees or providers as to how to navigate the often-complex processes of obtaining approval to use certain drugs.

The Deficit Reduction Act of 2005, designed to cut federal Medicaid spending by $43 billion in the next decade, may have a bias toward generics. The act grants states broad flexibility to alter benefits and to charge patients more. States were previously required to offer all Medicaid recipients the same level of services, but under the new law, states may create different standards, benefits, and restrictions for different groups of Medicaid beneficiaries.

This law has the considerable benefit of allowing more flexibility in addressing the clinical needs of individual patients or groups of patients. However, some of its provisions may potentially result in reduced access to medications. For example, states may now charge premiums, create or raise co-payments, and create penalties or incentives to encourage cost-saving behavior, such as taking preferred drugs.

*States now have the option of imposing a $3.00 co-payment for Medicaid recipients earning below 100% of the federal poverty level, up to a 10% co-payment for those earning between 100% and 150%, and a 20% co-payment for those earning in excess of 150%. In addition, states may require higher cost sharing for nonpreferred drugs than for preferred drugs, even for groups that are exempt from other cost sharing. (National Alliance on Mental Illness, *State Medicaid Reform Toolkit: What You Need to Know about the Deficit Reduction Act* [Arlington, VA: National Alliance on Mental Illness, 2006], http://www.nami.org/Template.cfm?Section=Medicaid&Template=/ContentManagement/ContentDisplay.cfm&ContentID=36207, accessed 23 June 2008.)
Preferred-Drug Lists

Implementation of preferred-drug lists has been shown to alter drug use and in some cases to reduce drug use in minority populations. From 1999 to 2002, Maine’s Medicaid Program implemented a restrictive drug formulary with pantoprazole as the only preferred proton-pump inhibitor. Three months after this change, the market share of pantoprazole in Maine increased by 10% among cash prescriptions (versus 3% in two New England control states) and by 7% among third-party-payer prescriptions (versus 1% in the two New England control states). The increase was 79% among Medicaid prescriptions (versus 1% to 2% in the control states).

Similar results were obtained in a 2002–3 study of two states, Illinois and Louisiana, with different preferred lists and prior-authorization criteria. After the two states’ enactment of preferred-drug lists for cardiovascular medications, the share loss for drugs not on the preferred lists was estimated to be more than 37% for practices with a high percentage of Medicaid recipients.

A study of state pharmacy claims from 2000 to 2003, before and after implementation of a preferred-drug list, found that the list was associated with a decrease in antihypertensive-drug use. In the year after implementation, the percentage of Medicaid patients discontinuing antihypertensive-drug therapy increased from 17% to 21%. The adjusted likelihood of discontinuation was 39% higher. Although the reasons for this increased discontinuation were not determined, the researchers noted that the restricted medications tended to be more recently introduced therapies with fewer side effects. In addition, patients might have become confused when one or more of their usual drugs were switched at the pharmacy.

A study of national pharmacy claims data from 2001 to 2003 investigated the effects of Medicaid preferred-drug lists. Preferred-drug lists were associated with an increase in “vintage” (time since a drug received approval from the US Food and Drug Administration to its use) of drugs used by Medicaid beneficiaries compared with non-Medicaid enrollees. This difference in vintage was fairly small (less than two months) for five of six therapeutic categories examined, but preferred-drug lists increased the vintage of Medicaid prescriptions for pain by more than 1.2 years compared with non-Medicaid prescriptions.

Co-payments

There are three main types of cost sharing: (1) co-payment, which is the payment of a fixed charge per prescription; (2) coinsurance, in which the patient pays a percentage of the prescription cost; and (3) the deductible, where the patient pays 100% of the prescription cost up to a certain amount.

The effect of coinsurance was examined early on in the 1980s by the RAND Health Insurance Experiment. This first study provided strong evidence of an inverse relationship between the coinsurance rate and prescription-drug use. A recent review by RAND researchers of 132 articles on cost sharing found that for every 10% increase in spending demanded of the consumer for pharmaceuticals, there is a 2% to 6% decrease in overall pharmacy spending. Increased cost sharing was associated with lower rates of drug treatment, worse adherence among existing users, and more-frequent discontinuation of therapy. Moreover, in patients with chronic illnesses, such as heart disease, diabetes, or mental illnesses, less use of pharmaceuticals was found to increase the use of more-expensive medical services.

Numerous studies have found cost sharing to have a high impact on minority and low-income populations. Studies of the introduction of co-payments by state Medicaid programs began in the 1970s and 1980s. Overall, Medicaid recipients in states requiring co-payments filled 5 (20%) fewer prescriptions annually than their counterparts in non-co-payment states (19.6 versus 24.6 prescriptions). Studies of the South Carolina Medicaid Program between 1976 and 1979 indicated that imposition of a $0.50 co-payment was associated with an 11% decrease in drug use and that there were differences among drug classes.

Relatively modest co-payments of between $0.50 and $3.00 have been associated with a reduction in prescriptions per patient of approximately 10% in Medicaid populations. A 1999–2002 study of a midwestern outpatient clinic responsible for
Medicaid clients found that an average increase in co-payment of $5 per prescription per visit was associated with a reduction of 0.4 prescriptions per visit per month. A 1987 study of Medicare-insured enrollees of a health-maintenance organization found results generally consistent with those in the South Carolina Medicaid study.

**Co-pays in Medicare**

With some exceptions, studies examining Medicare enrollees have found that co-payments have outcomes different from those produced by other government insurance programs or by absence of insurance. A 1997 report on drug-cost sharing and the use of therapeutic classes of drugs among elderly Medicare enrollees looked at co-payments as they went from $1.00 to $5.00 or from 50% to 70% of costs over a three-year period for enrollees in a large health-maintenance organization. No consistent support has been found for the hypothesis that exposure to costs for medication dispensing or that annual days of drug use would be affected by increases in prescription-drug co-payments. A 1997 study using data from the Medicare Current Beneficiary Survey also did not find that co-payments affect prescription filling in persons who were in excellent or very good health.

However, medication co-payments have been shown to suppress prescription filling among low-income Medicare recipients in poor health, especially those with disabilities. This was reported in a nationwide analysis of low-income elderly enrolled in Medicare. This study measured the per capita number of prescriptions filled in states that required co-payments ($0.50 to $3.00) versus those that did not. Results found reductions in the number of prescriptions filled for those with poor health. A study of the 1998–2000 Medicare Current Beneficiary Survey indicated that gaps in coverage resulted in reductions in drug use, especially among those with common chronic illnesses.

**Co-pays in Medicare Part D for Dually Eligible Enrollees**

The 7.2 million people currently enrolled in both Medicaid and Medicare are described as dually eligible beneficiaries. Prior to 2006, Medicaid provided these beneficiaries with prescription benefits that generally featured modest co-payments, although 12 states placed caps on the number of prescriptions allowed. In January 2006, dually eligible beneficiaries began receiving their drug benefits from the Medicare Part D program. The dually eligible are disproportionately members of minority groups. Dual eligibles are 43% minorities, whereas other Medicare recipients are 16% minorities. On the whole, Medicare Part D is likely to expand access to medications by minority populations. However, compared with other Medicare enrollees, duals may be at greater risk of suboptimal therapy since they are poorer and sicker, have more mental illness and dementia, and have less education. Utilization-management policies must be implemented carefully to avoid unintended consequences.

Under Medicare Part D, the duals are now confronted with increased financial barriers and reduced access in most states. Those with incomes below 100% of the federal poverty level now pay a co-payment of $1 for generics and $3 for brand-name products; those earning above 100% of poverty pay $2 and $5, respectively. For many duals this represents an increase in cost sharing over Medicaid co-pays (typically $3 or less, or even $0). Although relatively modest, these co-payments can accumulate for patients with multiple prescriptions. Nearly a third of the duals have chronic mental illness, and such patients may be susceptible to very small increases in co-payments. Moreover, in contrast to Medicaid, under Medicare Part D pharmacists are not required to waive co-payments if the beneficiary cannot pay, although they may waive co-payments for duals if they wish. States may pay co-payments on behalf of duals, and patients living in states with caps may see a reduction in their drug costs after switching to Medicare Part D if the number of drugs they take exceeds the cap.
Restrictions by private Medicare Part D plans potentially reduce access to medications. These plans may restrict drug coverage to two agents per therapeutic class, and they usually employ utilization-management techniques. For example, nonpreferred agents may be prescribed only after a preferred agent fails, and prior authorization may be required for nonpreferred drugs. Plans also vary in which drugs are covered on their formularies. Currently, Part D will not reimburse for off-label drug use. However, important and common uses for medications are often not included in the labeling of many drugs.

**DISPARITIES AT THE PHARMACY COUNTER**

A 1998 survey of New York City pharmacies found that 51% did not have an adequate opioid analgesic supply in stock sufficient to treat a patient with severe pain. Adequate supply was defined as at least one long-acting, one short-acting, or a variety of opioid analgesics on hand. Only 25% of pharmacies in predominantly nonwhite neighborhoods had sufficient opioid analgesic supplies, whereas 72% of pharmacies in predominantly white neighborhoods had sufficient supplies. A 2003–4 survey assessed the availability of sufficient opioid analgesic supplies in Michigan pharmacies. Pharmacies in white areas were about 13 times more likely to carry sufficient opioid analgesic supplies than those in minority areas. These racial/ethnic differences existed across residential neighborhood and income levels, but were more pronounced in low-income areas. Social class and poverty also played a role, but more so for white than for minority areas. The definitions of white and minority areas differed slightly in the New York and Michigan studies of opioid availability, but the results were similar.

Access to ancillary pharmacy services was examined in 2000–01 telephone surveys of the elderly population in West Texas. Elderly Hispanics had poorer access than elderly whites to medication delivery, counseling, and written information. Poorer proficiency in speaking and reading English were also associated with reduced access to these services. Patients with limited English proficiency may have difficulty understanding instructions for taking medications written on prescription labels. Pharmacies could supply labels translated into other languages. However, a survey by the New York Academy of Medicine of New York City pharmacies with a large percentage of customers with limited English proficiency found that although 80% of pharmacies reported that they had the ability to make such translations, only 38% of labels were translated daily. An additional 26% of the surveyed pharmacies reported that they never offered translated labels. Reasons given for not providing this service included lack of access to translation software or telephone interpretation of label information, language capability of store personnel, cost, time, and liability concerns.

Even if pharmacies would provide prescription labels in a native language, a patient who cannot read would still not receive the needed information. The New York Academy of Medicine study found that 88.5% of surveyed pharmacies had bilingual staff members, but less than half were pharmacists or pharmacy interns who would qualify to provide medication counseling.
CHAPTER III. PHARMACEUTICAL DISPARITIES: THE PROVIDER

SUMMARY

Providers may follow suboptimal prescribing practices, i.e., those that do not follow recommended guidelines, which may manifest as underprescribing, overprescribing, or misprescribing. Many studies have revealed disparities in prescribing for specific diseases or classes of medication, including asthma drugs, antidepressants, antipsychotics, cardiovascular medications, diabetes drugs, pain medications, and antibiotics and vaccinations for pneumonia. Suboptimal prescribing practices may be due to lack of knowledge about a particular minority group or to the prescriber’s beliefs about that group. The ability of the provider, usually a physician or pharmacist, to communicate and develop rapport with the patient may affect the patient’s use of medicines.

SUBOPTIMAL PRESCRIBING IN SPECIFIC DISEASES

Providers may follow suboptimal prescribing practices, i.e., prescribing patterns that do not follow recommended guidelines, which may manifest as underprescribing, overprescribing, or misprescribing. Outcomes that measure the effect of prescribing practices include the number and types of written prescriptions for a particular patient population.

The 1987 National Medical Expenditure Survey asked respondents about prescription medicines prescribed or obtained for children. This was a household survey, with the results limited to children with at least one ambulatory visit to a physician. The survey showed that, compared with white children, African American and Hispanic children were less likely to receive a prescribed medication and had, on average, fewer medications. Among preschoolers, African American children tended to receive fewer prescriptions than either white or Hispanic children. Among older children, both Hispanic and African American children were half as likely as white children to receive prescriptions. These disparities did not appear to be related to differences in need, since the data were corrected for differences in health and other factors.

Suboptimal prescribing practices may be due to lack of knowledge or to the provider’s beliefs about a particular minority group. The ability of the provider, usually a physician or pharmacist, to communicate and develop a rapport with the patient can affect the patient’s use of medicines. Many studies have revealed disparities in prescribing for specific diseases or classes of medication, including asthma drugs, antidepressants, antipsychotics, cardiovascular medications, diabetes drugs, pain medications, and antibiotics and vaccinations for pneumonia.

Asthma

In a 1989–90 study of preschool children hospitalized with asthma, Hispanic children were about 16 times more likely than white children not to be prescribed a nebulizer for home use upon discharge. In a study of largely African American and Hispanic inner-city children, most of whom were Medicaid insured with persistent asthma, only 50% of patients who should have been

*This analysis, like other analyses of national-survey data, divided racial and ethnic groups into three mutually exclusive categories: Hispanic, non-Hispanic white, and non-Hispanic black. We interpret these categories as Hispanic, white, and African American.
prescribed long-term-control medications, based on the frequency of their symptoms, were actually prescribed them.83

A 1996–8 survey of providers and caregivers whose practices were 98% African American inner-city children with asthma found that physicians prescribed long-term-control asthma medications for only 42% of the children, although 73% of the children who were classified as having persistent asthma should have been prescribed a long-term-control medication, according to national guidelines.84

Psychiatric Illness
Suboptimal prescribing has been extensively reported for minority patients with depression, bipolar illness, and psychosis.

Depression and Bipolar Illness
Research has focused on whether minorities, particularly Hispanics, are prescribed the most advanced antidepressant medications, such as selective serotonin-reuptake inhibitors (SSRIs). An analysis of 1992–5 data from the National Ambulatory Medical Care Survey found that among people prescribed antidepressants and with a diagnosis of depression, a slightly smaller proportion of Hispanics than non-Hispanic whites were prescribed SSRI medications (59.8% versus 65.6%).85 Analysis of data for 1992 to 1997 found that rates of SSRI use decreased among Hispanics between 1995 and 1997. Among office visits in which the patient was given a diagnosis of depression and prescribed an antidepressant, only 48.6% of Hispanics received a prescription for an SSRI, whereas with 58.2% of African Americans and 65.8% of white patients did.86

However, subsequent analysis of the 1998 National Ambulatory Medical Care Survey did not uncover disparities in SSRI use for Hispanics, even after adjusting for other variables. Similarly, in a 1995 analysis of general-medicine and family-practice clinics affiliated with an academic center in New Mexico, there was no difference in prescribing rates of SSRI or non-SSRI antidepressants for Hispanics versus non-Hispanic white patients.87 In a subsequent study, though, audiotapes of office visits showed that Hispanic patients were significantly less likely than non-Hispanic white patients to be given information about their antidepressants by their physician. Patients with a diagnosis of depression were more likely to receive only a non-SSRI drug if their provider was a psychiatrist; if their source of payment was not Medicaid, Medicare, or self payment; if they belonged to a health-maintenance organization with capitated visits; or if their diagnosis was major depression, as opposed to other forms of depression.88

In a 2001 study of almost 3,000 veterans with bipolar disorder, African Americans were less likely than non–African Americans to receive an SSRI. The difference, though statistically significant, was slight: 43% of African Americans versus 45% of non–African Americans. There was no significant difference between these patient groups in prescribing of tricyclics or other antidepressants, after adjusting for demographic, medical, and health-insurance characteristics.89

Psychosis
Several hospital-based studies in the 1990s showed that African American patients were more likely to receive antipsychotic drugs and/or to receive higher doses than white patients. In a 1995–8 study of 74 adolescent inpatients with a diagnosis of bipolar disorder, African Americans were nearly twice as likely as whites to receive treatment with an antipsychotic (86% versus 45%).90 In a chart review of 164 African American and white psychiatric inpatients, African American patients with schizophrenic disorders received higher dosages of antipsychotic drugs than white patients, even after correcting for diagnosis and socioeconomic status.91 In a study of 398 outpatients treated with antipsychotics, African Americans were more likely to receive higher doses, primarily with depot medications.92

This propensity to treat African American patients with antipsychotics may reflect a greater likelihood of a diagnosis of a psychotic disorder. In a 2000–2001 study of over 19,000 patients initiating treatment at a northeastern mental-health-delivery system, 19% of African American men were
diagnosed with a psychotic disorder, whereas 9.4% of Hispanic and 9.9% of white men were so diagnosed. For women, diagnoses of psychosis were 11%, 6%, and 6%, respectively. Parenthetically, Hispanics were more likely than African American or white patients to be given a diagnosis of major depression—the figures for women were 33%, 25%, and 20%, respectively. However, it is not clear whether psychosis is truly more common in the African American population or the frequency of this diagnosis reflects overdiagnosis, misdiagnosis, or bias among physicians.

Atypical Antipsychotics

Traditional antipsychotics were superseded as the medications of choice by atypical antipsychotics introduced beginning in the 1990s: clozapine (1990), risperidone (1994), olanzapine (1996), quetiapine (1997), ziprasidone (2001), aripiprazole (2002), and paliperidone (2006). The atypicals offer a decrease in serious adverse effects compared with traditional antipsychotic agents and are more effective in relieving the negative symptoms of schizophrenia, e.g., emotional and social withdrawal or psychomotor retardation.

Research into antipsychotic-prescribing patterns has revealed disparities in prescribing atypical antipsychotic medications (Table 2). Most of these studies focused on race did not report findings for Hispanics. Of the three studies that reported findings for Hispanics, two found no ethnic disparity relative to non-Hispanic whites.

African Americans are more likely to receive a depot formulation of older medication classes. It is possible that physicians are less likely to prescribe clozapine to African American patients because of the perceived heightened risks of diabetes and agranulocytosis. A 1997–9 analysis of antipsychotic medications provided by psychiatrists to a national sample of adults confirmed this racial disparity. African American patients were less likely than white patients to receive second-generation antipsychotic medications (49% versus 66%). This racial disparity remained after taking into account potential confounding factors, including clinical, sociodemographic, and health-system characteristics.

A 2001 study of almost 3,000 veterans with a diagnosis of bipolar disorder identified in a US Department of Veterans Affairs (VA) hospital network found that African Americans were about 30% more likely than non–African Americans to receive an antipsychotic of any type. They were also about 40% more likely to receive a first-generation antipsychotic. In contrast to the other studies reviewed in Table 2, this VA study found no racial/ethnic disparity in the prescribing of second-generation antipsychotics. This perhaps reflects a difference in prescribing patterns between the VA health-care system and the rest of the US health-care system.

National surveys (National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey) for 1992 through 2000 examined outpatient visits at which an antipsychotic was prescribed. Early gaps among racial/ethnic groups in receipt of atypical antipsychotic prescriptions decreased throughout the 1990s, but persisted for African Americans with psychotic disorders. From 1998 to 2000, the relative odds of receipt of an atypical antipsychotic at an office visit were lower for African Americans: When an antipsychotic was prescribed during an office visit, an atypical was prescribed for 54% of African Americans versus 65% of white patients.

Medicaid

National surveys found that Medicaid covered about half the office visits where African Americans and Hispanics received antipsychotic prescriptions. Medicaid patients were about 20% less likely than patients with other payment sources to receive an atypical antipsychotic, but ethnicity/race and Medicaid insurance coverage were independently associated with antipsychotic prescribing.

A 1995 study set in a northeastern state tracked Medicaid-insured patients with a diagnosis of schizophrenia for a year after the first prescription for an antipsychotic. African American subjects were less likely than white subjects to receive clozapine (8% versus 15%) and risperidone (25% versus 31%) and more likely to receive the older depot antipsychotics, fluphenazine decanoate and haloperidol decanoate (26% versus 14%).
### TABLE 2. Disparities in prescribing antipsychotic medication classes to African Americans

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Study</th>
<th>Setting</th>
<th>Prescribing of antipsychotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Eri Kuno and Aileen B. Rothbard, &quot;The Effect of Income and Race on Quality of Psychiatric Care in Community Mental Health Centers,&quot; <em>Community Mental Health Journal</em> 41, no. 5 (2005): 613–622</td>
<td>Community mental-health centers (Medicaid)</td>
<td>Communities with a high percentage of African Americans were less likely to receive atypicals</td>
</tr>
<tr>
<td>1997–8</td>
<td>Jayme L. Opolka, Karen L. Rascati, Carolyn M. Brown, and P. J. Gibson, &quot;Ethnicity and Prescription Patterns for Haloperidol, Risperidone, and Olanzapine,&quot; <em>Psychiatric Services</em> 55, no. 2 (2004): 151–156</td>
<td>Medicaid (Texas)</td>
<td>African Americans were twice as likely to receive a depot formulation</td>
</tr>
<tr>
<td>1999–2001</td>
<td>Tami L. Mark, Liisa A. Palmer, Patricia A. Russo, and Joseph Vasey, &quot;Examination of Treatment Pattern Differences by Race,&quot; <em>Mental Health Services Research</em> 5, no. 4 (2003): 241–250</td>
<td>Schizophrenia-treatment centers across the United States</td>
<td>African Americans were 60% more likely to receive 1st-generation antipsychotics; African American men were more likely to receive a depot formulation</td>
</tr>
<tr>
<td>2001</td>
<td>Amy M. Kilbourne and Harold Alan Pincus, &quot;Patterns of Psychotropic Medication Use by Race among Veterans with Bipolar Disorder,&quot; <em>Psychiatric Services</em> 57, no. 1 (2006): 129–126</td>
<td>US Department of Veterans Affairs hospital network</td>
<td>African Americans were 40% more likely to receive a 1st generation antipsychotic</td>
</tr>
</tbody>
</table>

*African Americans versus whites.*
differences remained significant after controlling for differences in demographics and service-use characteristics.\textsuperscript{100}

A 1997–8 study of Texas Medicaid–insured subjects with a diagnosis of schizophrenia or schizoaffective disorder reported that African Americans were only about two-thirds as likely as whites to receive the newer antipsychotics olanzapine or risperidone, as opposed to the older antipsychotic haloperidol (Figure 6).\textsuperscript{101}

**Community Mental-Health Centers**

A 1996 study analyzed psychiatric care provided by community mental-health centers in a northeastern city for Medicaid-insured patients with a diagnosis of schizophrenia. Study populations were categorized by the percentage of African Americans and by income level. Populations with a high percentage of African Americans were less likely than populations with a low percentage of African Americans to receive prescriptions for the newer, atypical antipsychotics, regardless of income level.\textsuperscript{102}

A 2003–4 study of patients being treated for schizophrenia at a northeastern community health center found that white patients were approximately six times more likely than African Americans to obtain a prescription for a second-generation (i.e., atypical) antipsychotic, after controlling for clinical and sociodemographic factors. Insurance status (Medicaid versus non-Medicaid), education, diagnosis, and other factors were not independent predictors of receipt of a second-generation antipsychotic. The study’s authors noted that physicians might be less likely to prescribe clozapine to African American patients because of the perceived heightened risks of diabetes and agranulocytosis.\textsuperscript{103}

**State Mental-Health System**

A 1996–8 study of a state public mental-health system identified a random sample of patients with a diagnosis of schizophrenia and with pharmacy records. Nonwhite patients were about half as likely as white patients to receive an atypical antipsychotic and about twice as likely to receive a decanoate (i.e., depot) medication. Hispanic patients were half as likely as non-Hispanic patients to be prescribed an atypical antipsychotic.\textsuperscript{104}

**Community Treatment Centers**

In a 1999–2001 study of schizophrenia care in six treatment centers across the United States, African Americans were less likely than non–African Americans to be prescribed any second-generation antipsychotic medications, including clozapine, and were 60% more likely to be prescribed only a first-generation antipsychotic. African American men were more likely to receive a depot formulation than were African American women or non–African Americans.\textsuperscript{105}

![Figure 6: Prescription patterns for psychotropic medications correlate with the patient’s race/ethnicity.](image)

In this 1997–8 study of Texas Medicaid patients, African Americans were significantly more likely to receive the first-generation antipsychotic haloperidol rather than the second-generation risperidone or olanzapine. Conversely, white patients were significantly more likely to receive a second-generation antipsychotic rather than haloperidol. Adapted from Jayme L. Opolka, Karen L. Rascati, Carolyn M. Brown, and P. J. Gibson, “Ethnicity and Prescription Patterns for Haloperidol, Risperidone, and Olanzapine,” *Psychiatric Services*; 55, No.2 (2004): 151–156.
Cardiovascular Disease

An early (1988–90) study examined cardiovascular medications given to patients hospitalized for acute myocardial infarction in a single county in Texas. Except for angiotensin-converting-enzyme inhibitors, on discharge Mexican Americans received all cardiovascular medication classes less frequently than non-Hispanic whites. The ethnic/racial difference was especially pronounced for antiarrhythmics, anticoagulants, and lipid-lowering therapy.\textsuperscript{106}

Cholesterol

A 1995–8 nationwide study of physician practices was based on data abstracted from medical charts of patients with coronary-artery disease or heart failure. African American men were less likely than white men to be prescribed lipid-lowering medicines and to reach their goal serum low-density-lipoprotein concentrations. Of those tested for blood lipids, 60% of white men and 47% of African American men were prescribed lipid-lowering drugs.\textsuperscript{107}

Hypertension

A 1996 national household survey was the basis of an analysis of the concordance of hypertension-drug treatment with national guidelines. These guidelines recommended first-line treatment with diuretics and β-blockers over angiotensin-converting-enzyme inhibitors or calcium-channel blockers. Being of African American descent and having a higher out-of-pocket payment were independently associated with a decreased likelihood of following the guidelines in the use of diuretics and β-blockers.\textsuperscript{108}

Patient questionnaires and blood-pressure measurement were used in a 2000–2002 population-based study of hypertension treatment of almost 7,000 adults 45 to 85 years of age in six communities across the United States. Pharmacological treatment of hypertension was greater among African American (81%) than among white (72%) hypertensives, but the percentage of treated but uncontrolled hypertension was greater among African Americans (36%) than among whites (24%). Successful treatment of hypertension (treated and controlled) was lower among Chinese (39%) and Hispanics (38%) than among whites (46%) and African Americans (45%). Compared with non-Hispanic whites, fewer Chinese and Hispanics used diuretics (22% and 32%, respectively, versus 47% for whites). Fewer African Americans used β-blockers (18% versus 28% for whites). More African Americans and Hispanics used calcium-channel blockers (40% and 33%, respectively, versus 25% for whites), and fewer Chinese used angiotensin-converting-enzyme-inhibitor/angiotensin-receptor-blocker combination therapy (40% versus 52% of whites).\textsuperscript{109}

Myocardial Infarction

A 1998 study of Medicare beneficiaries enrolled in managed care examined disparities in use of a β-blocker following myocardial infarction. Seventy-four percent of whites (versus 64% of African Americans) received a β-blocker after a myocardial infarction. Only 62% of beneficiaries with Medicaid insurance received a β-blocker after a myocardial infarction, whereas 74% of those with other types of insurance received one. There were also significant disparities in medication usage related to educational level. This racial disparity persisted after controlling for individual differences in socioeconomic variables.\textsuperscript{110}

More-recent (2003) data from the Agency for Healthcare Research and Quality indicate that racial and ethnic disparities in drug treatment of heart attacks persist. Using a composite measure, recommended in the 2005 National Healthcare Disparities Report, of drug treatment of patients hospitalized for heart attack, approximately 83% of non-Hispanic white patients received recommended care, whereas approximately 79% of (non-Hispanic) African Americans and 73% of Hispanics did.\textsuperscript{111}

Acute Coronary Syndrome

Black/white disparities in prescribing for acute coronary syndrome (ACS) were demonstrated in the 400-hospital CRUSADE study. Black patients had a similar or higher likelihood than whites of receiving older ACS treatments (aspirin, β-blockers, angiotensin-converting-enzyme inhibitors) but
were much less likely to receive recommended newer and potent ACS therapies, including acute 
glycoprotein IIb/IIIa inhibitors, acute and discharge 
clopidogrel, and statin therapy at discharge.\textsuperscript{111a} 
Failure to provide these newer therapies may have 
substantial clinical consequences. For example, 
initiation of lipid-modifying therapy before hospital 
discharge reduces recurrent coronary events in the 
months following an ACS event, and clopidogrel 
a cute and at discharge reduces long-term sequelae 
of ACS (myocardial infarction, stroke, death) by 
about 20\% over aspirin alone.\textsuperscript{111b} 
In a 2007 study, Green and colleagues reported an 
implicit racial bias among physicians in diagnosis 
and treatment with thrombolytic agents of a 
clinical-vignette patient presenting in the emergency 
department with acute coronary syndrome. Physicians 
(internal-medicine and emergency-medicine 
residents) reported themselves to be unbiased in their 
attribution of symptoms to coronary disease or in 
level of cooperativeness in black versus white patients. 
The physicians then took an implicit-association 
test, where they were asked to respond as quickly 
as possible to words or images designed to uncover 
unconscious attitudes and associations. The test 
revealed an implicit preference for white versus black 
patients and implicit stereotypes of black Americans 
as less cooperative with medical procedures and less 
cooperative generally. Physicians showing greater 
implicit bias were more likely treat white patients and 
not treat black patients with thrombolytic agents.\textsuperscript{112} 
Diabetes 
A study conducted in long-term-care facilities 
in five states from 1993 to 1997 used the 
Systematic Assessment of Geriatric Drug Use via 
Epidemiology (SAGE) database, which recorded 
gothing and structured evaluations of residents 
with document diabetes mellitus. After adjusting 
for sociodemographic characteristics, comorbid 
conditions, and diabetes severity, African Americans 
and Hispanics had slightly lower rates of antidiabetic-
medication use than non-Hispanic white patients. 
The analysis indicated that compared with whites, 
5.5\% to 6.4\% fewer African Americans and 
2.9\% fewer Hispanics had a recorded use of any 
antidiabetic medicine. In South Dakota, 11\% fewer 
Native Americans had any antidiabetic 
medicine use, whereas there was no significant 
difference between these groups in New York state.\textsuperscript{113} 
Pneumonia 
The 2005 \textit{National Healthcare Disparities Report} 
adopted a composite measure of hospital care for 
pneumonia, largely based on antibiotic treatment 
and vaccination. As of 2003, a significantly lower 
percentage of Medicare African American (52\%) than 
non-Hispanic white (59\%) patients hospitalized for 
pneumonia received this standard of care.\textsuperscript{114} 
Acute Pain 
Pain Assessment 
Research at the University of California, Los 
Angeles, Emergency Medicine Center examined 
whether physicians’ ability to assess pain 
severity differed for Hispanic and non-Hispanic 
white patients presenting to the emergency 
room (ER) with extremity trauma. There were 
no differences between the two ethnic/racial 
groups in the patients’ assessments of their 
pain, in the physicians’ assessments, or in the 
agreement between the patients’ and physicians’ 
assessments.\textsuperscript{115} In a 1999 study of patients 
attending a Utah university hospital ER with 
painful conditions, there was no difference between 
white and Hispanic patients in their experience of 
pain or their expectations of pain management.\textsuperscript{116} 
However, in a 2004 study of patients undergoing 
treatment for painful disorders in the ER of an 
urban medical center, the physician’s perception 
of whether a patient was exaggerating symptoms 
was associated with the patient’s ethnic/racial 
background. Physicians’ ratings for perceived 
exaggeration of symptoms were highest for Native 
American, lowest for Hispanic, and intermediate 
for white and African American patients.\textsuperscript{117} 
Analgesics 
Although national quality-improvement initiatives 
implemented in the late 1990s were followed by 
substantial increases in opioid prescribing in the 
United States, differences in opioid prescribing by
race/ethnicity apparently have not decreased. A 2008 study of pain-related visits to US emergency departments, using data from the National Hospital Ambulatory Medical Care Survey, found that in 2000 non-Hispanic white patients were more likely than others to receive an opioid, and differential prescribing by race/ethnicity had not diminished since 2000. Although opioid prescribing for pain-related visits increased from 23% in 1993 to 37% in 2005, over all years white patients with pain were more likely to receive an opioid (31%) than black (23%), Hispanic (24%), or Asian/other (28%) patients. Differences did not diminish over time, with opioid-prescribing rates of 40% for white patients and 32% for all other patients in 2005. Differential prescribing by race/ethnicity was evident for all types of pain, was more pronounced with increasing pain severity, and was detectable for long-bone fracture and nephrolithiasis as well as among children.118

A number of previous studies also found disparities in the use of pain medications in the ER for patients with bone fracture:

- In a 1990–1 study of patients attending the University of California, Los Angeles, Emergency Medicine Center after a bone fracture, Hispanics were twice as likely as non-Hispanic whites to receive no pain medication. About half (55%) of Hispanics with extremity fractures received no analgesic. Although ethnicity appeared to influence care received, ethnic disparities found in this study were not explained by patient characteristics, including primary language.119

- A 1990–2 chart review of 250 consecutive patients admitted to a university medical center in San Diego, California, with limb fracture found significant differences in analgesics administered to African American, Hispanic, and white patients. White patients consistently received higher doses of analgesics than African Americans or Hispanics. White patients received 22 milligrams of morphine sulfate equivalents per day, African Americans received 16 milligrams, and Hispanics received 13 milligrams. These ethnic differences persisted after controlling for possible confounding variables. There was no difference among the ethnic/racial groups in receipt of acetaminophen or nonsteroidal anti-inflammatory drugs.120

- In a 1992–5 study in Atlanta, Georgia, of subjects treated for bone fracture, 57% of African American and 74% of white patients with extremity fractures received analgesics.121

Several studies have not found disparities in receipt of analgesic medications in patients with bone fractures:

- Treatment in the ER of children with bone fractures was recorded in the 1992–8 National Hospital Ambulatory Medical Care Survey. Race and ethnicity did not affect the likelihood of receiving any analgesic medication, although regional differences were uncovered.122

- In a study of the frequency of analgesic use in children with fractures at a trauma center in Cincinnati, Ohio, in 1991 and 1992, about half of all children received analgesics. There were no ethnic/racial differences in the fraction of patients given analgesics.123

- In a 1992–3 study of adults and children seen at an ER in Phoenix, Arizona, for bone fracture, Hispanics and white patients were equally likely to receive analgesia.124

- In a retrospective study of adults with bone fracture seen at a San Francisco, California, ER in 1998 and 1999, there was no difference among racial/ethnic groups (white, African American, Hispanic, and Asian) in the likelihood of receiving analgesia; 20% of all patients received no analgesia, and 31% received no parenteral analgesia.125

- In a 2004 study of patients undergoing treatment for painful disorders in the ER of an urban medical center, there was no difference between ethnic/racial groups in the proportion of patients treated for pain.126

Osteoarthritis

A study of a VA medical center in Durham, North Carolina, indicated that there were differences in the classes of analgesic and anti-inflammatory medications given to African American and
white veterans with osteoarthritis, even though this was an equal-access health-care system that required minimal co-payments for medications. African Americans were more likely than whites to be prescribed nonselective nonsteroidal anti-inflammatory drugs (69% versus 60%), but less likely to be prescribed coxibs (the newer, more selective versions of these drugs) (4% versus 7%) or narcotic analgesics (33% versus 40%).

### Cancer

A study of minority patients attending clinics for cancer treatment was based on structured questionnaires for patients and their physicians. Hispanic patients with cancer were less likely to have adequate treatment of pain than African American patients. In another study of minority patients (African American and Hispanic), 65% did not receive guideline-recommended analgesic prescriptions, whereas 50% of nonminority patients did not. In these studies, more minority patients had the severity of their pain underestimated by their physicians, reported that they needed stronger pain medication, and felt that they needed to take more analgesics than their physicians prescribed. Compared with African American patients, a larger proportion of Hispanic patients reported lower levels of pain relief and concern that they were taking too much medication and expressed a need for more information about pain management.

### CULTURAL SENSITIVITY

Disparities have been reported as a result of cultural, communication, and trust issues on the part of physicians. In a 2001 Commonwealth Fund survey, subjects were interviewed over the telephone via random-digit dialing. African American, Hispanic, and Asian respondents were more likely than white respondents to feel that they would receive better medical care if they belonged to a different race/ethnicity and that medical staff judged them unfairly based on race/ethnicity.

### Asian Americans

Focus groups at community health centers in the northeastern United States in 1999–2000 indicated that immigrants from China and Vietnam with limited English proficiency wanted to discuss the use of non-Western medical practices with their providers but encountered significant barriers. Asian Americans were significantly less likely than white respondents to report that their physicians listened to everything that they had to say (47% versus 69%) or to feel that their doctor involved them in decision making as much as desired (59% versus 80%). The primary language of 90% of the Asians in this study was English, and only 27% had been in the United States for 10 years or less, indicating that most could be considered to be acculturated.

Only about one-quarter of Chinese Americans in a 1994 survey reported being very satisfied with the health care provided by the Western-based system, whereas a descriptive study of Chinese attending acupuncture clinics in five states indicated that they were highly satisfied with Chinese medical care.

Patients’ attitudes toward physicians’ styles of interaction were investigated in a recent mail survey of 504 residents in a multicultural metropolitan county in the western United States. Scales measured patients’ attitudes toward “doctor dominates” and “shared decision making” styles. Filipino and Japanese respondents had positive attitudes toward the paternalistic, doctor-dominant style, scoring 0.45 and 0.24, respectively, on a scale from −1 to +1, while white patients held negative attitudes, scoring −0.33. A greater proportion of Filipinos than other ethnic/racial groups were recent immigrants, suggesting that immigrants from countries with traditional paternalistic relationships between doctor and patient may be uncomfortable with increased two-way interaction. Filipino patients held negative attitudes (score −0.35) toward shared decision making, while white patients were more positive (score 0.15). Almost 50% of Filipino respondents in this study had college degrees, similar to the percentages for white and Japanese respondents, perhaps suggesting that the study findings could not be attributed to differing levels of formal education.
African Americans

Questionnaires testing perceptions of physician-patient communication were given to African American and white patients before and after visiting a physician at a southern VA hospital between 2001 and 2004. African American patients were less likely than white patients to perceive that their physicians’ communication was supportive and informative. In addition, African American patients had lower post-visit trust in their physicians than did white patients. These differences were on the order of 1.2 to 1.3 on a 10-point scale. Prior to the first visit, there was no difference between African American and white patients’ trust in their physicians, indicating that distrust of the medical establishment was not inevitable among African Americans and that poor physician-patient communication patterns may have accounted for the differences in post-visit trust.\(^{136}\)

An analysis of audiotape and questionnaire data collected from African American and white patients in the Baltimore–Washington–Northern Virginia metropolitan area in 1998 and 2002 showed that physicians were more likely to be “verbally dominant” with minority patients. Physicians talked 43% more than African American patients but only 24% more than white patients.\(^{137}\)

A 1996–8 telephone survey of urban managed-care enrollees measured patients’ assessments of their primary-care physician’s “participatory style.” African Americans rated their visits as less participatory than did white patients. Patients in race-concordant relationships with their physician also rated their visits as more participatory than did patients in race-discordant relationships. The differences, though statistically significant, were relatively small, only 2 to 3 points on the 100-point scale that measured participatory-decision-making style.\(^{138}\)

Language

Language concordance between physician and patient is important to the patient’s ability to understand and follow the prescribed therapy. The US census conducted in 2000 indicated that about 14% of the inner-city population spoke only Spanish at home.\(^{139}\) While Title IV of the Civil Rights Act of 1964 mandates access to translation services for persons with limited English proficiency,\(^{140}\) a series of studies have documented language, Spanish in particular, as a barrier to access to pharmaceutical treatment. In a survey of Hispanics attending an inner-city Latino pediatric-care clinic in 1996–7, language problems were cited most frequently by parents as the single greatest barrier to health-care access for their children. Five percent of parents, who spoke little or no English, reported that the inability of medical staff to speak Spanish had led to prescription of inappropriate medications.\(^{141}\)

As reported below, language issues have been reported to impair adherence to medications in patients treated for asthma and diabetes.

Asthma

National-survey data from 1988 to 1994 indicate that the risk of children’s receiving inadequate asthma therapy when Spanish was the preferred family language was 64.6 times greater than when English was the preferred language. However, the survey’s authors stated that the strikingly high risk among Spanish-speaking children may have reflected the small sample of only 56 Spanish-speaking children, and they suggested that a larger sample could yield a less-dramatic result.\(^{142}\)

A retrospective study of medical charts carried out between 1979 and 1987 in an urban community where one-third of residents were Hispanic and Spanish speaking indicated that patients were slightly less likely (not a statistically significant difference) to miss their asthma medication when they and their physicians spoke the same language. Adherence to asthma-maintenance medications was monitored in this study by blood tests for the asthma drug theophylline.\(^{143}\)

In a survey of outpatients attending a hospital located within an inner-city Hispanic community, 47% of those who had poor English or used a translator said that medication side effects of asthma medications were not explained to them, whereas 16% of those with good English skills reported that side effects were not explained.\(^{144}\)
In a study of inner-city adults with moderate to severe asthma, adherence was measured by electronic monitoring of patients’ actuations of their inhaler devices. Both poor patient-clinician communication (measured with a questionnaire to determine the patients’ satisfaction with their relationships to their physicians) and Spanish as primary language were associated with poor adherence.145

**Diabetes**

A 2000–2001 multicenter survey of over 4,000 individuals with diabetes enrolled in managed care showed that 23% of Spanish-speaking Hispanics reported a language barrier with their primary-care provider, and only 52% of those requiring an interpreter reported that an interpreter was always provided if needed.146

A 2000 study at two urban primary-care clinics in California found that the greater the physician’s fluency in Spanish, the higher a Spanish-speaking diabetic patient rated interaction with the physician. Most of the 116 patients were being treated with insulin or oral hypoglycemic drugs or both.147

A 2000 study of physicians’ assessments of patients’ recall and comprehension during outpatient visits was based on audiotapes of encounters with English-speaking patients with diabetes mellitus and low health literacy. Primary-care physicians rarely assessed patient recall or comprehension of new concepts. After multivariate logistic regression, physicians’ application of a standardized interactive communication strategy was independently associated with good glycemic control.148
SUMMARY

Many studies have documented lower adherence among ethnic/racial minorities than in the majority population. Low adherence has been reported in minority patients being treated for asthma, depression, psychosis, cardiovascular diseases, osteoporosis, and diabetes, and it has been reported in those receiving vaccinations. Low adherence has been reported in filling initial prescriptions, refilling prescriptions, and taking medications according to directions. Low medication adherence in minority populations has been found to be correlated with reduced health status.

Much of the association between race/ethnicity and low adherence is explained by low household income and lack of insurance. However, education, health literacy, and cultural beliefs are also important contributors. Compromised adherence due to poor communication by providers, often due to lack of cultural-competence training, is discussed in Chapter III. Use of alternate remedies by minorities may complicate and sometimes detract from treatment with Western medicines.

MEDICATION ADHERENCE

This chapter examines patients’ characteristics that may help explain underuse of medicines by minorities. The measure of “use of medicine” at the patient level is adherence, defined here as the extent to which the patient initiates or continues the agreed-upon mode of treatment. While nonadherence, or noncompliance, usually means underuse of medicines, it can also mean overuse or misuse. Nonadherence with medications may be unintentional or intentional, a deliberate choice by the patient not to use a drug because of its cost or side effects or because of lack of understanding of its purpose. In the studies discussed below, outcomes used to quantify adherence include rates of prescription filling or rates of failure to use filled prescription medicines in accordance with instructions. The studies have found that adherence rates are affected by the patient’s cultural beliefs, health literacy, socioeconomic status, ethnicity, or race.

A 1995 study of dually eligible Medicare-Medicaid beneficiaries (i.e., the elderly poor) in 10 states revealed that African Americans filled approximately 20% fewer prescriptions than whites. A 1999 study of elderly Medicare beneficiaries with chronic illnesses found that African Americans and Hispanics without any drug coverage used 10% to 40% fewer medications, on average, than their white counterparts and spent up to 60% less in total drug expenditures. Having drug coverage lessened these differences, although dually eligible African American beneficiaries and Hispanics with employer-sponsored drug benefits still used substantially fewer medications than their white counterparts.

With regard to particular diseases, low adherence has been reported in minority patients being treated for asthma, depression, psychosis, cardiovascular diseases, osteoporosis, and diabetes and in minority patients’ rates of receiving vaccinations.

Asthma

Low adherence to medications was seen in a study of low-income, primarily inner-city African American children with moderate to severe persistent asthma. The average use of inhaled anti-inflammatory medications in their possession was 44% of the prescribed dosage, and the inhaler technique used by 27% of the children likely provided ineffective delivery of the drug.
Measurement of adherence in this study was based on inspection of inhaler canisters, patient self-reporting, and pharmacy records.  

Finkelstein and colleagues examined asthma medication use among an economically diverse population of children within a single managed-care system from 1991 to 1995. Low-income and predominantly nonwhite children insured through Medicaid were as likely as other children (predominantly white and non-Medicaid) to have been prescribed inhaled long-term-control medications for asthma, but they were only about 70% as likely to have filled the prescriptions.  

The Asthma Care Quality Assessment Project, a study of Medicaid-insured children conducted in 1999 based on parental reporting, found that smaller proportions of African American (20%) and Hispanic (13%) children than white (22%) children within the same Medicaid managed-care populations used anti-inflammatory medications daily. After adjusting for demographics and asthma status, African American and Hispanic children were 36% to 48% less likely than white children to be using daily anti-inflammatory medications.  

**Depression**  
A 1980s study of Southeast Asian refugees with depression who stated at a clinic visit that they were regularly taking their antidepressant medications found only 5 of 32 subjects had antidepressant blood levels in the therapeutic range. In a contemporaneous study of 41 Southeast Asian patients diagnosed with depression and undergoing long-term treatment with tricyclics, no antidepressant drug was detectable in blood samples from 61% of the patients, indicating a high rate of nonadherence.  

In a 1995 analysis of general-medicine and family-practice clinics affiliated with an academic center in New Mexico, Hispanic patients were significantly less likely to be adherent to antidepressant therapy during the 100-day period following a medical visit than non-Hispanic white patients. Analysis of pharmacy records of prescription refills indicated that Hispanic patients had a mean adherence rate of 59% whereas the rate for non-Hispanic white patients was 75%.  

In a 2001–2 study of 122 subjects recruited from an urban community mental-health center, monolingual Hispanics (mostly Puerto Ricans), bilingual Hispanics, and African Americans had lower medication adherence rates (77%, 76%, and 68%, respectively) than whites (90%). Medication adherence was defined as the number of pills taken divided by the number prescribed and was measured via electronic monitoring of pill bottles.  

In a nationwide study of almost 1,500 managed-care patients interviewed from 1996 to 1998 before entering a clinical trial of treatment for depression, Miranda and Cooper found no racial/ethnic differences in the proportion of patients reporting that their primary-care provider had recommended treatment for depression (39% to 46% of interviewees had received recommendations to begin treatment).  

Nationwide, differences appear to exist between ethnic/racial minorities and non-Hispanic whites in the initiation of treatment for depression, but not in the continuation of treatment once it has commenced. An analysis of national-survey data for 2000 showed that African Americans and Hispanics with self-reported depression were less likely than whites to begin treatment with an antidepressant medication. Among patients who filled their initial prescription, however, there were no racial or ethnic disparities in the probability of receiving an adequate trial of antidepressant medication. However, in the study by Miranda and Cooper, among patients who received recommendations to begin treatment, only 45% of Hispanics took an antidepressant, whereas 61% of African American and 74% of white respondents did. Even among those who received specialty mental-health care, only 56% of Hispanic patients took an antidepressant, whereas 63% of African American and 72% of white patients did.  

**Schizophrenia and Schizoaffective Disorder**  
In a 1997–8 study of Texas Medicaid claims, African American and Mexican American adult patients diagnosed with schizophrenia or schizoaffective disorder possessed significantly fewer days’ supply of antipsychotic medication.
than white patients in the year after beginning treatment. The supply was 19 days less for African Americans and 18 days less for Mexican Americans. White patients had an average of 190 adherent days, or 6.3 months. For patients of all ethnicities/races, the newer, atypical drug olanzapine was associated with 55 more adherent days than the first-generation antipsychotic, haloperidol. In a 1999–2001 study of schizophrenia care in six treatment centers across the United States, self-reported medication adherence in the previous four weeks was only slightly, but still statistically significantly, lower for African Americans than for non–African Americans (88% versus 92%).

### Cardiovascular Disorders

Studies have shown that nonadherence to lipid-lowering drugs is more frequent among African Americans and Hispanics than among non-Hispanic whites. National-survey data from 1988 to 1994 indicate that, even when identified as having high cholesterol that required medication, African American and Mexican American patients were less likely than white patients to be taking cholesterol-lowering agents. Among individuals who had high cholesterol and who were told to take a medication, adjusted odds ratios showed that African Americans were about one-third as likely as Mexican Americans and about one-half as likely as whites to be taking a cholesterol-lowering agent. Overall, 29% of African Americans, 28% of Mexican Americans, and 49% of whites told to take medication to control high blood cholesterol actually did so.

In a retrospective study of a midwestern managed-care organization from 1998 to 2001, nonadherence was defined as the percentage of days without taking a statin medication over periods of active statin use (a gap in statin treatment). African Americans were approximately twice as likely as whites to be nonadherent and were 40% more likely to discontinue treatment.

In a study of self-reported adherence to lipid-lowering medications by patients receiving specialty care in New York, race/ethnicity was significantly associated with nonadherence. Nonadherence was only 2% among white non-Hispanic subjects, but it was 11% among African American and 18% among Hispanic subjects.

A 1997–8 survey of community-dwelling elderly patients aged 77 years or older with hypertension in Galveston County, Texas, showed that Hispanics, but not African Americans, used significantly less antihypertensive drugs than non-Hispanic whites. Characteristics associated with the lower use of antihypertensive drugs included older age and low income in whites, poor cognition and infrequent physician visits in African Americans, and lack of Medicaid insurance in Hispanics.

However, studies of patients with no disparities in health insurance also showed ethnic/racial differences in adherence. In a review of veterans attending US Department of Veterans Affairs clinics in North Carolina, African Americans were 1.7 times as likely as white patients to report being nonadherent to their antihypertensive medication. Among veterans participating in a clinical trial of the management of hypertension, nonwhite participants were about 3 times more likely to report intentional nonadherence with their antihypertensive medications than their white counterparts. Nonwhite participants, as well as individuals with less than a 10th-grade education, were also more likely to report unintentional nonadherence than their white or more-educated counterparts.

### Diabetes

Data from the 1999 Medicare Current Beneficiary Survey of elderly Medicare beneficiaries found that the odds of diabetic beneficiaries’ filling prescriptions for antidiabetic medications were significantly lower for African Americans and Hispanics than for whites, even when supplementary drug coverage was available. However, the odds of African Americans without any medical coverage filling prescriptions for antidiabetic medications were almost identical to those of African Americans with Medicare coverage.
Osteoporosis

In a study of women identified as having low bone mass after being tested at a US Department of Veterans Affairs center from 1998 to 2001, white patients were more than twice as likely as African American patients to report taking antiresorptive drugs, even after accounting for differences in bone-loss severity and prior fractures.¹⁷¹

Antiretrovirals

A clinic-based study of African American and non-Hispanic white patients who received antiretroviral therapy after the year 2000 found that African Americans were about twice as likely to discontinue an efavirenz-based regimen. A plausible, though unproven, explanation for this greater discontinuation rate is that populations of African origin are more likely to carry a polymorphism associated with reduced enzyme activity in the drug-metabolism gene CYP2B6, leading to higher average effective doses of efavirenz and hence more side effects.¹⁷²

SOCIOECONOMIC STATUS AND ADHERENCE

The rate of filling high-urgency prescriptions given to children upon discharge from the emergency room was investigated in a 2001 medical-chart review. Prescriptions for children with private insurance were more likely to be filled (68%) than were those of children with Medicaid insurance (57%). The difference in prescription filling was socioeconomic, i.e., private insurance versus Medicaid, and there did not appear to be any striking racial/ethnic disparity.¹⁷³

A 1998 study of adherence to inhaled steroids found that a patients’ having less than 12 years of formal education increased the odds of low adherence almost sevenfold. Adherence was defined as an average of less than 70% of the prescribed dose of inhaled corticosteroid.¹⁷⁴

A study exploring the relationship between adherence and characteristics of adult asthmatics at an urban center from 2000 to 2002 found African American race/ethnicity and patient attitude were both associated with lower adherence. The association between race/ethnicity and adherence was reduced, though not eliminated, when household income and possession of commercial insurance were taken into account, suggesting that the effects of race/ethnicity may be due in part to socioeconomic status.¹⁷⁵

Data from the 2001 California Women’s Health Survey indicate that among women who had sought specialty mental-health services (which included appropriate pharmacotherapy), those with an income below the federal poverty level as well as those of Hispanic (but not African American) ethnicity/race had a lower probability of obtaining these services in the past year.¹⁷⁶

A 1990–1 study examined the rate of adherence to lipid-lowering drugs among elderly New Jersey Medicaid enrollees with incomes below the poverty level compared with adherence among elderly patients on Pharmacy Assistance for the Aged and Disabled Program, who were from a less-impooverished population. The rate of adherence to lipid-lowering agents was much lower for the Medicaid population, who were 57% as likely to continue taking medication.¹⁷⁷

Lower socioeconomic status is typically, though not invariably, associated with lower vaccination rates. In the 2003 National Health Interview Survey report, rates of pneumococcal vaccination among the elderly were about 10 percentage points lower for the lowest socioeconomic stratum.¹⁷⁸ The National Vaccination Survey of urban areas from 1996 to 1999 found that vaccination coverage was consistently lower among children living below the poverty level.¹⁷⁹ A 2001 telephone survey in Tennessee found that people with less education (a proxy for lower socioeconomic status) were more likely to receive an influenza vaccine: 39% of those with less than high-school education received the vaccine, whereas 28% of those with more than high-school education did.¹⁸⁰ In a subsequent (2004) random telephone survey of Tennessee residents, persons under 50 years of age and with annual household incomes of $30,000 or less were less likely to get vaccinated for influenza than were those under 50 years of age and with higher incomes.¹⁸¹
HEALTH LITERACY AND ADHERENCE

This section addresses the relationships between minority status and health literacy, and it examines the detrimental effects of poor health literacy in patient adherence to treatment regimens. “Health literacy” refers to the set of skills needed to read, understand, and act on basic health-care information. Inadequate health literacy may have a detrimental effect on an individual’s ability to understand prescription instructions, communicate effectively with health-care providers, and navigate complex health-care systems. Health-educational materials intended to answer questions about medications and side effects are frequently written at a reading level that is too difficult, especially for patients for whom English is a second language. Due to the highly technical nature of the language of medicine, patients may not understand seemingly common medical terms.

Hispanics and Asians

A 2001 Commonwealth Fund survey found that Hispanics and Asian Americans were substantially more likely than whites or African Americans to have difficulty understanding prescription instructions. Only 64% of Hispanics and 66% of Asian Americans found it very easy to understand a prescription label, whereas 79% of African Americans and 82% of non-Hispanic whites found it very easy. Those whose primary spoken language at home was not English also had poorer health literacy: 51% of Hispanics and 47% of Asian Americans who were English speaking found it very easy to understand information from the doctor’s office, whereas only 37% of Hispanic and 16% of Asian American non–English speakers found it very easy.

In a cross-sectional study of more than 2,500 patients, most of them members of minority groups, who received acute care at two inner-city hospitals, 35% of the English-speaking patients had inadequate or marginal functional literacy. For the Spanish-speaking patients, the figure was much higher (62%). Those with marginal literacy frequently misread information on prescription bottles (34% gave incorrect responses for understanding instructions to take pills, and 52% gave incorrect responses for taking medication on an empty stomach).

African Americans

Patients with low health-literacy skills may not identify themselves. In a study of functional health literacy in 131 African American outpatients treated for diabetes at Georgia municipal hospitals, between one-quarter and one-half of the patients were identified as having adequate health literacy. Of those with inadequate health literacy, 43% denied having any difficulty in reading. In addition, 54% of those with inadequate literacy skills said that they did not usually ask anyone to help them read medical forms.

Health-education materials sometimes overlook cultural attitudes and beliefs. A 1994–5 investigation found that 54% or less of the cancer education materials specifically targeting African Americans were culturally sensitive to African Americans (e.g., used terminology familiar to African Americans, showed African Americans in pictures of patients). Few materials were written at a reading-grade level for those with low literacy skills.

Lower health literacy among asthmatics correlated strongly with improper use of metered-dose inhalers in a 1995–6 survey of patients, most of them African American, who attended an emergency room or asthma clinic at an urban public hospital. Poor metered-dose-inhaler technique was observed in significantly more patients reading below the third-grade level (48%) than those reading at the high-school level (89%).

In a study of adults, predominantly African American, who were hospitalized for severe asthma exacerbations, inadequate health literacy was identified in 22% of participants and was associated with lower asthma-medication knowledge and worse metered-dose-inhaler technique. However, poor health literacy was not associated with difficulty learning or retaining appropriate metered-dose-inhaler technique.
suggesting that inadequate health literacy is not an insurmountable barrier to acquiring key asthma-self-management skills.\textsuperscript{188}

There is also a relationship between health literacy and treatment outcomes in persons with diabetes. In a 2000 study of outpatients, health literacy was inadequate in 58\% of Hispanic, 19\% of Asian, 17\% of African American, and 6\% of white patients. A higher level of health literacy was independently associated with good glycemic control. Compared with those with sufficient health literacy, patients with inadequate health literacy had poorer control of their blood sugar levels and higher rates of retinopathy.\textsuperscript{189}

The Elderly

Over 3,000 Medicare enrollees in a national managed-care organization were interviewed in 1997 to determine the proportion of elderly patients who had low health-literacy skills. This study uncovered striking deficiencies in their understanding of critical areas of health care. Thirty-four percent of English-speaking and 54\% of Spanish-speaking elderly enrollees had inadequate health literacy. Moreover, there was a markedly high prevalence of inadequate health literacy in patients over 85 years of age. This study suggests that low health literacy may impair elderly patients’ ability to manage their medical problems.\textsuperscript{190}

**CULTURAL BELIEFS, ATTITUDES, AND PRACTICES REGARDING MEDICATIONS**

Studies on cultural aspects of minority populations as they relate to the use of pharmaceuticals are reviewed below. Immigrants from countries with non-Western medical cultures may have different expectations regarding type of drug prescribed, tolerance of side effects, dosage, form preferred, or other aspects of drug therapy, and variations in attitudes and beliefs about Western concepts of disease, medicines, and physician behavior may be related to culture.\textsuperscript{191} These attitudes and beliefs may complicate the ability or willingness of a patient to follow through with a treatment plan.

It is important to note that these findings regarding cultural factors associated with groups cannot be generalized to all individuals of the group. Stereotypes should be avoided, because individuals vary greatly in their practices, beliefs, literacy level, and ability to communicate. The interaction with and treatment of patients must always be personalized.

**African Americans**

Prevalent among African Americans is a historical distrust of the medical establishment.\textsuperscript{192} Focus groups composed of 15 low-income, inner-city African American adults with persistent asthma uncovered mistrust of the medical establishment, in addition to other health beliefs that influenced their use of medications. These patients often relied on their own assessment of asthma control rather than those of their providers, and they expressed concern about the adverse effects of inhaled corticosteroids.\textsuperscript{193}

**Hmong Americans**

In structured interviews conducted from 2000 to 2001 with Hmong Americans with a history of hypertension, over one-half of the respondents reported that they did not take hypertension medication “all or most of the time.” Nearly three-quarters (71\%) believed that American medicines for hypertension were too strong for Hmong due to their side effects, and over one-third (37\%) believed that traditional practices and herbal medicines were more effective and safer than American medicines. Hmong individuals who thought that American medicine was too strong were almost twice as likely to miss medications.\textsuperscript{194} A belief that American medicines are too strong may have some rational basis. East Asians, for example, do require lower doses of many prescription medications than westerners.\textsuperscript{195}

*This belief ignores evidence of poison from some herbal medicines. The US Food and Drug Administration has issued consumer advisories about aristolochic acid and other toxins found in Chinese dietary supplements available in the United States.*
Filipinos
A perceived need to use antibiotics for upper-respiratory infections explained part of the association between Filipino ethnicity and inappropriate use of antibiotics that emerged in a recent postal survey of 504 residents in a multicultural metropolitan county in the western United States. Use of antibiotics one or more times per year for upper-respiratory infections was reported by 72% of Filipino, but only 39% of white and 45% of Japanese, respondents. Filipinos had a significantly stronger perceived need for antibiotics (score of 3.5 on a 7-point scale, in contrast to a score of 2.8 for white respondents) and a significantly lower antibiotic-knowledge (score of 5.7 on a 13-point scale, in contrast to 7.5 for white respondents). Stronger perceived need for antibiotics, inferior knowledge of antibiotics, and Filipino ethnicity/race were all independently associated with inappropriate use of antibiotics.196

Hispanics
A similar perceived need to treat their children’s upper-respiratory infections with antibiotics was more prevalent among racial/ethnic minorities in a survey of over 500 parents in the Los Angeles metropolitan area in 2000–2001. Eighty percent of Hispanic parents expected to receive antibiotics, whereas 74% of Asian, 67% of African American, and only 51% of white parents did.197

Diabetes is about twice as prevalent among Mexican Americans (the largest Hispanic subgroup in the United States) than among non-Hispanic whites, yet Hispanics are more reluctant to initiate insulin therapy.198 In an anonymous survey distributed to a large multicity sample of diabetic patients not taking insulin, more minorities (Asians, African Americans, and Hispanics) reported being unwilling to take insulin than non-Hispanic whites (35% versus 22%).199

The phenomenon of a patient refusing insulin therapy is termed psychological insulin resistance. Poor glycemic control and delayed introduction of insulin treatment is believed to result in the increased prevalence of several disease complications observed in Hispanics, including diabetic retinopathy.200 In addition to language and communication barriers, it has been suggested that cultural factors may contribute to the reluctance to accept insulin therapy in the Hispanic community: a perceived lack of respect from health-care providers and fatalismo, a learned cultural belief that an individual cannot alter his or her fate.201

A recent study examined the prevalence of unexplained neurological symptoms among Hispanic and non-Hispanic patients with somatization, defined as the presentation of physical symptoms as a manifestation of psychological distress. While unexplained neurological symptoms were documented in equal percentages of Hispanic and non-Hispanic patients, these symptoms were qualitatively different in Hispanics.202 The symptoms observed in Hispanics had features of ataque de nervios, a culture-specific syndrome that has a significant overlap with panic disorder and features of anxiety disorders and dissociative symptoms.203

A telephone survey of US adults with depression examined ethnic differences in patients’ treatment preferences for depression. While the majority of patients (70%) found antidepressant medications to be an acceptable treatment, Hispanics (59%) and African Americans (51%) were less likely than whites (74%) to find antidepressant medications acceptable. Fifty-six percent of African American, 51% of Hispanic, and 34% of white respondents thought that antidepressant medications are usually addictive.204

BELIEFS REGARDING CHRONIC ILLNESS
Chronicity in illness is a Western biomedical concept that may not be well understood by people from other cultures. Unfamiliarity with this concept may interfere with the acceptance of drugs that must be taken long term. Most of the evidence here concerns selected groups in the Hispanic/Latino population.

Structured interviews of older individuals in California in the 1990s showed that, in contrast to African and Filipino Americans, Hispanics did not hold mainstream Western views about health and the management of illness. Almost without exception, these Hispanic respondents appeared
not to understand the meaning of “chronic” in relation to their illness. Each new exacerbation of symptoms was seen as a separate illness, unrelated to previous episodes, particularly in illnesses with multiple symptoms.205

A 1995–6 population-based survey of 155 predominantly Puerto Rican inner-city households found that perceptions of asthma were based on the presence of symptoms, regardless of the patient’s asthma status.206 In a study of 25 inner-city Dominican American mothers, interviewed in their homes in their primary language (Spanish), 60% thought that their child did not have asthma in the absence of an acute episode, and 72% expressed the belief that prescribed medicines should be administered only in specific symptom crises.207

In a recent study of 198 predominantly low-income and nonwhite inner-city (New York City) adults hospitalized for asthma, 62% of whom were Hispanic, 53% were found to hold the belief that they only had asthma when they were symptomatic. This “no symptoms, no asthma” belief was found to correlate with lower adherence to daily inhaled-corticosteroid therapy and an increased expectation of being cured. In univariate analyses, elderly male patients who spoke only Spanish were most likely to subscribe to the no-symptoms-no-asthma disease paradigm. However, this belief was not associated with race/ethnicity.208

Thus, these attitudes toward medications may reflect the degree of acculturation.

In a 1993 study of 28 mainland Puerto Rican families, parents whose asthmatic children were adherent to medication (measured by serum levels of the drug) were significantly more acculturated (assessed by questionnaire) than parents whose children were not adherent.209 A 1997–8 study of Navajo families with children who had asthma found that asthma was generally perceived as a transient symptomatic episode.210

Belief that asthma is a transient illness seems to be less prevalent among African Americans. In a 1996–8 survey of caregivers of inner-city children with asthma, only about 15% believed that it was not at all important or somewhat important to give a child regular care when the child did not have symptoms.211

ALTERNATIVE MEDICINES

Hispanics

Some Hispanic immigrants place importance on folk medicine.212 Anecdotal evidence indicates that newly arrived and unacculturated Hispanic immigrants in East Harlem often favor folk medicine, the type of health care familiar to them in the rural areas of their homelands. They also believe that medicine prescribed by US health-care providers is made of harmful chemicals and is therefore toxic. A grandmother demonstrated her distrust of Western medicines in caring for her eight-year-old granddaughter, who had been prescribed several medications for AIDS: “Although the purpose and side effects of each medication had been explained to her grandmother, she continued to use herbal remedies for her granddaughter’s affliction instead.”213

The use of herbal remedies (echinacea, St. John’s wort, ginseng, ginkgo biloba, soy supplements) was studied systematically in a survey of 322 adults attending primary-care practices in the Houston, Texas, metropolitan area from 2002 to 2003. Herbal remedies were used by 50% of Hispanic, 50% of Asian, 22% of African American, and 41% of white respondents. Approximately two-thirds of Hispanics and Asians who used herbal remedies took them while taking prescription medicines for the same health problem. Approximately one-third of Hispanics and Asians who used herbal remedies informed their doctor or pharmacist, whereas two-thirds of white subjects did. An immigrant family history was independently associated with the use of herbal remedies.214

A 1992–3 study of a Puerto Rican community in the northeastern United States found that ethnobotanical remedies used for childhood asthma fit within a coherent cultural-belief system. Interviews of mothers bringing their asthmatic children to community health centers indicated that half had been schooled exclusively in Puerto Rico (the site of education being a proxy for acculturation). A number of Puerto Rican folk remedies were used, but the most commonly tried remedy was a Western camphor rubbing ointment (Vicks VapoRub). These remedies, though they had
none of the bronchodilatory or anti-inflammatory effects of modern asthma medications, worked as expectorants or purgatives and were effective from the point of view of the mothers’ health-belief system, which included the belief that expelling mucus and phlegm from the body was beneficial for the treatment of asthma.215

The above findings were specific to particular communities and cannot be generalized to all Hispanic populations, which vary in their practices and beliefs.216 An analysis of the 2002 National Health Interview Survey indicated, in fact, that Hispanics and African Americans in the United States used alternative medicines less frequently than the non-Hispanic white majority. African Americans and Hispanics, however, were less likely to disclose the use of alternative medicines to their health-care provider.217

Failure to disclose the use of alternative medicines is a concern because of the potential toxicity of some of these preparations. Based on semistructured interviews with 547 survey participants, an evaluation of the use of alternative preparations in the El Paso, Texas, region in 2002 identified 599 instances of the use of remedies that could result in drug interactions, disease interactions, or adverse reactions.218 A 2001 survey of Spanish-speaking Hispanic families visiting a pediatric clinic in Salt Lake City, Utah, found that 35% reported using metamizone—a nonsteroidal anti-inflammatory drug prohibited in the United States because of the risk of agranulocytosis. The authors of this study reported that the drug was available over the counter in Latin American countries and in markets serving immigrant communities in the United States.219

Asian Americans

Interviews of 205 elderly Korean immigrants indicated that they used both Western medicine and traditional Korean medicine. Treatments included acupuncture and herbal medicines.220 Interviews of four hanui (traditional Korean professional physicians) practicing in the Washington, DC, area indicated some use of traditional medicines in tablet form and explanation symptoms and treatment with reference to Western biomedical terms.221

A 1993–4 survey of Chinese patients seen at an emergency room near New York’s Chinatown district indicated that the use of traditional Chinese remedies persisted among second-generation Chinese immigrants (44% and 42% of first- and second-generation Chinese, respectively, had used traditional Chinese remedies in the week before the emergency-room visit).222
CHAPTER V. ETHNIC AND RACIAL DIFFERENCES IN RESPONSE TO MEDICATIONS

SUMMARY
A growing body of research documents differences among racial and ethnic population groups in the metabolism, effectiveness, and side-effect profiles of many important drugs. Grouping people into ethnic or ancestral categories may be useful when discussing trends among populations, in increasing the clinician’s awareness of possible differences in drug response, and in considering alternative treatment modalities. These groupings should not be used to make firm decisions about medications or to limit options for an individual patient. However, failure to take these potential differences into account when prescribing or choosing dosages or when selecting agents for formularies or preferred-drug lists has the potential for suboptimal treatment and for accentuating disparities.

ETHNIC AND RACIAL DIFFERENCES IN DRUG RESPONSE AND SIDE EFFECTS
Even when medication adherence is adequate, response to a medication may differ among ethnic/racial groups. A growing body of research is uncovering differences among population groups in the metabolism, effectiveness, and side-effect profiles of many important drugs. Labeling of eight percent of new drugs approved between 1995 and 1998 contained a statement about ethnic or ancestral differences in effectiveness.

Groupings of people into ethnic or ancestral categories may be useful in discussions of trends among populations and in increasing clinicians’ awareness of possible differences in drug response and consideration of alternative treatment modalities, but these groupings should not be used to make firm decisions about medications or for limiting options for an individual patient. To do so would be to stereotype in ways that could accentuate existing health-care disparities.

However, failure to take these differences into account when prescribing or choosing dosages or when selecting agents for formularies or preferred-drug lists has the potential for suboptimal treatment and could also accentuate disparities. For example, since African Americans may metabolize psychiatric medications more slowly than Caucasians, they may experience more severe side effects; as a result, they may stop taking medications at a greater rate than Caucasians with similar diagnoses.

Numerous studies have reported differences in response to medications between East Asians and other populations. The drug dosages used in clinical trials with East Asian subjects (conducted in both Asia and the United States) typically have been lower than dosages in trials with Western subjects. For instance, East Asians respond to lower doses of antipsychotic drugs and are more sensitive to side effects. In Asian countries, optimal treatment with lithium is achievable with serum concentrations below 0.8 milliequivalents per milliliter, as opposed to the range of 0.8 to 1.2 milliequivalents per milliliter generally regarded as therapeutic in Western countries. Similarly, the β-blocker propranolol is more effective in reducing blood pressure and heart rate in Chinese populations than in Caucasians.

The differences in drug response between East Asians and westerners seem to persist in East Asian emigrants to Western countries. The observed higher maximum blood concentration of the antipsychotic drug haloperidol persists in US-born compared with foreign-born Chinese, Filipino, Japanese, and Korean subjects. Similarly, the percentage of individuals with a slow clearance rate of the antituberculosis drug isoniazid is similar among Japanese and Chinese populations in Western countries and in their countries of origin. Ethnic/racial differences in drug-metabolism rates appear in many cases to have
a genetic basis (see “Role of Genes in Response to Medications,” below), although environmental factors may contribute.

Examples of differences in response to drugs and side effects of psychotropic, cardiovascular, and antimicrobial agents in populations with Asian, Hispanic, and African ancestry are discussed below.

**Depression and Psychosis**

East Asians require lower doses of some psychotropic drugs, have more side effects, and likely have reduced adherence if prescribed medication doses are based on the standards for whites. The antipsychotic clozapine is an example of such a drug. In a study of 34 age- and sex-matched Korean American and white schizophrenic or schizoaffective patients treated with clozapine, the Korean Americans experienced more anticholinergic and other side effects, though their dosage and blood concentrations were lower.22 Similarly, another study found that East Asians in Singapore have a lower dose requirement for clozapine compared with Caucasians when controlling for body-mass index, tobacco, alcohol, and caffeine use.22

Hispanics have been reported to require lower doses and are more prone to side effects at normal doses of tricyclic and selective-serotonin-reuptake-inhibitor antidepressants. A 1979 study of medical charts of women outpatients receiving tricyclic antidepressants found that Hispanics received less than half the daily dose of tricyclic antidepressants but reported more side effects than whites.23 A more recent clinical trial of women taking selective serotonin-reuptake inhibitors for depression found that Hispanic women reported fewer adverse effects than non-Hispanic women.23

Hispanics also tend to require lower doses of antipsychotic medications. In one study, the average effective dose of antipsychotic medication for Hispanics was half the effective dose in Caucasians and African Americans. In several 1990s studies, weight-standardized doses of some neuroleptic medications given to Hispanics were lower than those given to non-Hispanic whites.232 For example, a 1996 study of schizophrenic inpatients at a New York facility found that mean stabilized standardized doses of antipsychotic drugs were lower for Hispanic (mostly immigrant) patients than for white patients and were lowest for immigrant Chinese patients.233

In a study set in Texas, the average, weight-standardized therapeutic dose of antipsychotic medication for Hispanics was half the dose given to non-Hispanic whites and African Americans.234 Another contemporaneous study, however, found no differences in the doses of antipsychotic drugs given to Hispanics and Anglos (Caucasians).235

The lower doses of neuroleptics and antipsychotics required by Hispanic and Asian patients suggest they may be more sensitive to the physical effects from these types of drugs. Given the variable findings in antipsychotic use, it is possible that providers’ sensitivity to ethnic/racial minorities, the use of relationship-building strategies, or the use of case managers may play a part in how this type of medication is prescribed and used.236 Other data suggest that these differences in sensitivity may be related to immigrant status rather than Hispanic origin.237

Increased sensitivity of Hispanics to antidepressant and antipsychotic agents may result in part from differences in diet, recreational drug use, or folk medicines.238 For antidepressants, the class of drugs being taken by Hispanics (older tricyclics with different and potentially less tolerated side effects compared with newer selective-serotonin-reuptake-inhibitor antidepressants that have better-tolerated side effects) may be a factor in how well these two antidepressant classes are tolerated and used.

Differences in sensitivity to drugs or in drug metabolism may also reflect genetic factors (see “Role of Genes in Response to Medications,” below). However, in the case of psychotropic drugs, genetically determined differences between Hispanics and non-Hispanic whites in rates of drug metabolism have not been proven. A study with the tricyclic antidepressant nortriptyline in nondepressed patients found no pharmacokinetic differences between Hispanics and whites.239 Indeed, Hispanic populations encompass a complex
distribution of genetic heritages, as well as cultures, so a genetic difference peculiar to Hispanics as a group is not likely.  

**Hypertension and Heart Failure**

Ethnic/racial differences in adverse reactions to cardiovascular medications have been reported and reviewed in a meta-analysis. Pooled analyses from 24 clinical trials indicate that people of African origin have a 3-times-greater risk of angioedema from angiotensin-converting-enzyme inhibitors compared with other people. East Asians have an almost-3-times-greater risk of cough from angiotensin-converting-enzyme inhibitors compared with white patients. Persons of African origin have 1.5 times the risk of intracranial hemorrhage from thrombolytic therapy compared with others. These greater risks of adverse effects may lead to poorer drug adherence, although this has not been empirically tested.

The meta-analysis also reports that in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO)-1 trial, 17% of black patients and 11% of nonblack patients experienced moderate to severe bleeding following thrombolytic therapy. In a small clinical trial, black patients experienced significantly more depression from hydrochlorothiazide compared with whites. In other trials, nonwhite race or ethnicity (black, Hispanic, or other) is a risk factor for hospital admission from bleeding after oral anticoagulation for deep-vein thrombosis, and among patients treated with ibutilide fumarate injection for atrial fibrillation or flutter, 3 of 20 (15%) black patients developed torsade de pointes, whereas 1 of 38 (2.63%) white patients did.

Since African Americans are relatively more likely to have a deficiency of nitric oxide, which plays a role in dilating blood vessels and controlling blood pressure, they may respond better to drugs that enhance nitric oxide activity. A 2004 study found a regimen consisting of two such drugs, hydralazine plus isosorbide dinitrate, beneficial in African American patients.

**Hepatitis C**

African Americans may not respond as well as Caucasians to antiviral treatments for hepatitis C. A 2004 study found that a drug combination of peginterferon alpha-2b and ribavirin was far less effective among African Americans compared with Caucasians: 52% of non-Hispanic Caucasians versus only 19% of African Americans showed an absence of the hepatitis virus in their blood six months after treatment with this combination. The difference in response rate was not associated with viral strain or with sociodemographic or clinical characteristics. The reason the treatment was less effective in African Americans is currently unknown.

**ROLE OF GENES IN RESPONSE TO MEDICATIONS**

Variability in drug response among individual patients is determined by a combination of physiology (e.g., age, body weight), environmental factors (e.g., diet, alcohol, caffeine), and genetics. Since some variations in genes governing the sensitivity to drugs are either more or less common among certain population groups, response to drug therapy may differ according to ethnicity/race. A literature review found significant differences in frequencies between people of European ancestry and those of African ancestry for over two-thirds of gene variants associated with drug response.

Variations in genes encoding drug-receptor proteins may alter sensitivity to a drug’s effect, and some differences in drug response among ethnic/racial groups appear to be related to such genetic variations. Studies of twins and blood relatives have shown that genetic factors are important determinants of the normal variability of drug effects. Gene-linked variability across ethnic/racial groups has been reported in response to medicines used in the treatment of cancer, asthma, and hypertension.

**Cancer**

Only a minority of lung-cancer patients respond to gefitinib (Iressa). The tumors of patients who respond carry mutations in a gene encoding a receptor for epidermal growth factor, whereas
nonresponders do not carry these mutations. Epidermal-growth-factor-receptor mutations are more frequent in Japanese patients with lung cancer than in US patients, and Japanese patients are correspondingly more likely to respond to gefitinib.246

Asthma
Genetic variations may underlie differences in the effectiveness of the β-agonist albuterol in the treatment of asthma. Groups of genetic variations are called haplotypes, and different haplotypes are associated with patients’ various responses to albuterol. For example, haplotype 4 is associated with depressed responsiveness, and haplotype 2, with increased responsiveness. Some of the haplotypes appear to be either more or less common in different ethnic groups. Moderate responses to albuterol may occur less frequently and low responses may occur more frequently in Hispanics compared with non-Hispanic Caucasians.247 Responsiveness to albuterol also differs across Hispanic subpopulations; Puerto Ricans appear to be less responsive to albuterol than Mexicans, and this is believed to have a genetic basis.248

Congestive Heart Failure
β-receptor-blocking agents have been reported to be less effective in blacks compared with whites when used in the management of cardiovascular conditions.249 A recent report suggests that this may reflect a relatively greater frequency in African Americans compared with whites (40% versus 2% to 3%) of a gene polymorphism (GRK5-Leu41) that codes for an endogenous substance that already blocks these receptors, thereby limiting further action at the receptors.250

**VARIATION IN DRUG-METABOLISM GENES MAY ALTER BLOOD LEVELS OF DRUGS AND CLINICAL OUTCOMES**

In addition to their influence on drug-receptor proteins, with consequent effects on sensitivity to drug action, genes also code for drug-metabolizing enzymes and thereby influence the rate of drug metabolism. Variations in these genes may result in slower or faster drug metabolism. A person receives one copy of a gene from each parent, but each copy may have a mutation that results in reduced enzyme function or no enzyme production at all. An individual with two, one, or no normal copies of a gene may be a rapid, intermediate, or poor metabolizer, respectively. Poor metabolism results in higher blood levels of the drug, which in turn may result in greater effectiveness or, more likely, greater side effects.

Variations in the CYP2C9 gene are clinically relevant to treatment with the antidiabetic glipizide and the anticoagulant warfarin. The presence of only one inactive copy of this gene (out of two) is sufficient to interfere with the metabolism of warfarin, a drug with a narrow window between effective blood levels and toxic blood levels. Individuals with one inactive copy of the gene are at risk of excessive anticoagulation. Since fewer East Asians (2% to 5%) than Caucasians (25% to 30%) carry an inactive variant of this gene, East Asians are at relatively less risk for excessive anticoagulation.251

In the case of the CYP2C19 gene, however, the converse situation pertains: East Asians are more likely than Caucasians to have gene variations that alter the effectiveness of drugs whose metabolism is controlled by this gene. More East Asians (15% to 25%) than Caucasians (2%) carry two inactive copies of the gene. This pattern has been shown to be predictive of poor metabolism of the ulcer drug omeprazole (Prilosec). Thus, East Asians are more likely than Caucasians to have gene variations that result in higher blood levels of omeprazole. Exposure to omeprazole (and consequently the therapeutic effect of suppression of gastric acidity) is greater in individuals who have the gene variations.252
The CYP2D6 gene codes for metabolism of dozens of drugs, including cardiovascular agents, antipsychotics, antidepressants, and analgesics. The possession of two inactive variants of CYP2D6 results in a completely inactive enzyme, poor metabolism, and higher blood levels of drugs. This condition occurs in only about 0.5% of East Asians, whereas it occurs in 3% to 10% of Caucasians. Conversely, possession of a double copy of a particular variant of this gene (the *10 variant) is rare among Caucasians but occurs in up to 25% of East Asians. This *10/*10 gene pattern results in a still-active enzyme, with residual but reduced activity. An individual whose genome includes this pattern is an intermediate metabolizer, with a reduced rate of metabolism of many drugs, which may lead to somewhat higher blood levels. For example, exposure to the effects (and side effects) of the antidepressant nortriptyline is increased in *10/*10 individuals. By contrast, codeine, which must be metabolized to morphine by the enzyme coded by CYP2D6 to become active, is less effective in *10/*10 individuals, who may find that a normal dose of codeine is inadequate.

Polymorphisms have been identified in the gene coding for cytochrome P450 enzyme CYP2B6. This enzyme plays a major role in the metabolism of many therapeutically important drugs, including the anti-HIV drug efavirenz. A CYP2B6 polymorphism, the *6 allele, associated with reduced enzyme activity in the liver is more frequent in populations of African origin. This might explain the approximately 20% reduction in oral clearance in African Americans compared with other ethnicities/races, and this might have significant implications concerning the efficacy of efavirenz in people of African descent. Poorer metabolism of the drug could mean an effectively higher dose with more side effects, leading to greater likelihood of nonadherence to treatment. This may explain the finding that African Americans were about twice as likely as non-Hispanic white patients to discontinue an efavirenz-based regimen.

**IMPLICATIONS OF DRUG-METABOLISM DIFFERENCES FOR THERAPEUTIC SUBSTITUTION**

Cost-management programs that may require therapeutic substitution within drug classes in patients stabilized on a given agent of the class may create the need for substantial dosage adjustments when the patient is switched to an alternate agent from that class. Two drugs within the same therapeutic class may be metabolized by different enzymes, which are controlled by different genes. Clinicians should be alert for the potential need for dosage adjustment if the two drugs utilize different metabolic pathways, where one pathway is subject to genetic variation and the other is not.

For example, two drug classes whose members use different metabolic pathways are the proton-pump-inhibitor ulcer drugs and the tricyclic antidepressants. Among the proton-pump inhibitors, the metabolism of omeprazole (Prilosec) is dependent on the CYP2C19 genetic variations, whereas the metabolism of rabeprazole (AcipHex) is not. Similarly, among the antidepressants, CYP2C19 is important in the metabolism of clomipramine, but not of nortriptyline. Since East Asians are more likely than Caucasians to have gene variations that affect the metabolism of drugs controlled by CYP2C19, they may be more likely to require dosage adjustment when switched between CYP2C19-dependent and CYP2C19-nondependent proton-pump inhibitors or antidepressants.

**THE FUTURE: GENETIC TESTING MAY PREDICT LIKELIHOOD OF DRUG RESPONSE OR ALTERED DRUG METABOLISM**

There are many current examples, mostly in cancer drugs, where genetic factors that influence drug response are known, detected, and used to determine if a drug will work for an individual patient. Genetic tests are also available to detect variants in some of the genes commonly involved with drug metabolism, including several of the CYP-series genes. Testing for genetic variations and metabolic status prior to drug treatment
would allow accurate selection of medications and dosages, thereby reducing costly drug interactions and toxic responses. Among 27 drugs frequently cited in adverse-drug-reaction studies, 59% are metabolized by at least one enzyme with a gene variant known to cause poor metabolism. However, the sensitivity and positive predictive value of genetic screening for drug-metabolism defects is not perfect, because diet, alcohol consumption, and physiological differences also affect drug metabolism. In addition, variations in other genes (e.g., drug-receptor genes) may also play an important role in a drug’s effectiveness.

The use of DNA chips—solid surfaces dotted with thousands of gene snippets that may be screened simultaneously—to detect variations in drug-metabolism genes is already feasible and may eventually make genetic screening easier and faster. However, as there is not a perfect, one-to-one correspondence between a genetic-test result and poor metabolism, not all poor metabolizers will be detected, and not all subjects with a positive test result will actually have poor metabolism. Thus, it is unlikely that genetic testing will ever be completely predictive of an individual’s drug-metabolism capacity.

**IMPLICATIONS FOR PRESCRIBING AND POLICY**

The numerous ethnic/racial variations in drug metabolism and drug sensitivity underscore the need for individualized prescribing and dosing and should be important considerations in determining the range of available therapeutic choices on drug formularies and preferred-drug lists. Differences in metabolic pathways among drugs of a class, coupled with ethnic/racial differences in frequency of gene variation in these pathways, call for caution when implementing drug-substitution policies. Genetic testing may eventually be useful in identifying situations in which therapeutic switching is appropriate. Studies that measure the clinical effects of substituting agents whose metabolic pathways differ are generally not available at this time. Until individualized genetic profiles of patients become a clinical and economic reality, ethnic/racial background—like other categories, such as age and gender—should be considered when selecting drugs and may provide useful information for the potential need for dosage adjustment.
CHAPTER VI. RECOMMENDATIONS FOR REDUCING DISPARITIES IN PHARMACEUTICAL TREATMENT

SUMMARY

Care should be taken that drug-utilization-management programs for minorities not have the unintended consequences of overly restricting the range of available drugs. Cost-sharing levels for low-income minority groups should not be so high as to represent a barrier to prescription filling.

Practitioners should be alert to atypical drug responses or unexpected side effects in patients from various racial and ethnic backgrounds. Medication misuse may be due to misunderstood instructions or misperceptions of Western medicine or the severity of disease. Dosage adjustments may be needed for patients from different groups, as supported by pharmacological evidence.

Health literacy may be addressed by the development of clinician manuals that are tailored for minorities and that offer suggestions pertaining to the understanding and use of medications. Practitioners may also require additional training in communicating proper medication use with ethnic/racial-minority patients.

Health-care organizations should educate staff about health beliefs and cultural norms regarding pharmaceuticals. Organizations should provide education programs and interventions that increase patients’ skills and confidence in managing and assessing medication-related health problems. Organizations should collect and stratify data about disparities in pharmaceutical treatment and outcomes and integrate this information into ongoing quality-improvement, patient-safety, and disparity-reduction efforts.

Through education about risks, benefits, and safeguards of modern drug-testing protocols, minority-health-advocacy groups should encourage minority patients to participate in clinical trials.

REDUCING DISPARITIES ORIGINATING IN INSURANCE PROGRAMS

Health-policy makers should create or enable drug-benefit programs that are broad and flexible enough to allow access for minority and socioeconomically disadvantaged clients. This could improve the quality of care provided and be useful in controlling health-care costs. The availability of a broad range of medicines enables physicians to treat patients with precision and provides options when the first agent used is ineffective or not well tolerated or when proper compliance is not achievable. Care must be taken when substituting drugs within a class, because clinical effects may vary among racial and ethnic groups due to differences in drug metabolism or sensitivity at the receptor level. For health-care practitioners to engage in racially and ethnically appropriate prescribing, a wide range of options must remain available. Policies that arbitrarily limit drug choices stand in opposition to an increasing body of evidence indicating that drug therapy does the most good (and the least harm) when it is tailored to the individual. Personalized prescribing takes into account a number of factors—among them environmental, genetic, and cultural factors—that may affect effectiveness and adherence to prescribed treatment regimens.

Pharmaceutical-cost-management policies must consider any possible discriminatory effects on racial and ethnic groups. Limiting access to optimal medications may produce reduced or unexpected responses in subpopulations. Access to a variety of medications and dosing formulations, especially those enabling simplified administration (e.g., once daily or without regard to food) may facilitate adherence and may be particularly beneficial for patients with low health literacy who may have trouble following complex instructions. Patients with low health literacy or language barriers may be ill equipped to understand the limitations.
of restrictive pharmaceutical-cost-management policies and the appeals processes necessary to obtain a more appropriate drug. Restricting access to medications that will provide optimal care may also accentuate existing disparities in health care.

Minority-advocacy organizations should monitor insurance plans for policies having the potential to create or accentuate disparities. These organizations should encourage enrollment in Medicare Part D to relieve the cost burden on low-income minority elderly. Although it is too early to determine the full impact of Medicare Part D, it has been suggested that the complexity of this new drug benefit could lead individuals to make inappropriate choices about which plan is best for them; the concern is greatest for individuals with cognitive impairments, low health literacy, or poor English skills.261

Cost Sharing in Medicaid and Medicare

The pharmaceutical-benefit plans associated with Medicaid and Medicare currently provide minority and disadvantaged populations with needed access to pharmaceuticals. To solidify and sustain these benefits, policy makers should not undermine the intent of the benefits by setting cost sharing at a level that represents a barrier to prescription filling for low-income minority groups. Even modest cost sharing for individual prescriptions may mount up for persons who must take multiple medications.

Because of their low incomes relative to the general Medicare population, minority dual eligibles in the Part D Program may be disproportionately affected by cost sharing. Illness, language barriers, and poor health literacy may also disproportionately hinder duals as they attempt to enroll in the program. To ensure that Part D does not worsen disparities, Medicare needs to establish robust quality-assurance-monitoring programs.262

Medicaid- and Medicare-policy makers should avoid drug-utilization-management programs that have the unintended consequence of overly restricting the range of available drugs. Such policies include those that predispose prescribing of older, less technologically advanced agents. The individual patient should receive the optimal agent for his or her condition, regardless of the drug’s age or generic availability. Since co-payments may inhibit access to needed medications, co-payments could be individualized on the basis of expected benefits.263

The Deficit Reduction Act of 2006 now enables states to create different standards, benefits, and restrictions for different groups of Medicaid beneficiaries. This is a step in the right direction, because it allows states to implement different benefits and cost-sharing requirements for different subpopulations of patients with various medical and economic needs. These types of polices enable states to waive or reduce co-pays for patients requiring multiple medications or to reduce co-pays in cases where failure to fill a prescription due to cost may result in a health-care crisis. Such “value-based insurance” is beginning to be applied successfully in the private health-insurance market. Chernew and colleagues have reported the effects of a large employer’s value-based insurance initiative designed to improve adherence to medication regimens. The intervention, which reduced co-payments for five chronic-medication classes, reduced nonadherence by 7% to 14% for four of the five classes.264

PHYSICIAN EDUCATION: HELPING PRACTITIONERS TO BRIDGE THE CULTURAL DIVIDE

Cultural proficiency is now recognized as an important aspect of patient-centered care and health-care quality.265 Increased cultural proficiency among practitioners may help to reduce patient dissatisfaction with treatment and increase adherence.266 Health-care organizations should educate staff about the health beliefs and cultural norms of different ethnic/racial and socioeconomic groups, especially regarding beliefs about pharmaceuticals. Currently, linguistically and culturally appropriate care is lacking in many hospitals.267

Practitioners should provide individualized treatment to each patient. Although physicians cannot anticipate how a particular patient will respond in every instance, it is imperative to individualize therapy regarding the appropriate
choice of drug and dosage and to ensure that the patient understands the prescribed treatment and is able and willing to adhere to it. Practitioners should be alert to atypical drug responses or unexpected side effects when they treat patients from various racial and ethnic backgrounds. Patients may not be taking the medication properly due to misunderstood instructions or misperceptions of Western medicine or the severity of disease. Dosage adjustments may be necessary for patients from different groups, as supported by pharmacological evidence.

**Communication and Health Literacy**

Practitioners should take special care to communicate clearly and concisely with patients for whom there may be a linguistic barrier or low health literacy. Perceiving and surmounting less-visible barriers, such as patient confidence, shame, or fear, are also prime considerations. Practitioners need to communicate effectively across cultural, socioeconomic, educational, and geographical differences. Any written materials distributed should be appropriate to the patient’s level of health literacy and should reinforce spoken dialogue.

A growing number of organizations, including the Institute of Medicine, the Agency for Healthcare Research and Quality, the American Medical Association, the Joint Commission, the American College of Physicians, and the American Academy of Family Physicians, have issued reports on health literacy. The Institute of Medicine has identified health literacy as a priority area and recommended that public and private entities become involved in providing education and intervention programs. The Institute of Medicine has also stated, “Health literacy must be understood and addressed in the context of culture and language.” The American Medical Association and affiliated groups have provided a manual as well as multimedia toolkits for informing physicians, health-care professionals, and patient advocates about health literacy. Online resources are also available for health-care professionals. Some screening tests for health literacy are available for specific subgroups (Spanish speakers, the elderly). Health literacy may be addressed by the development of manuals for clinicians that are tailored for minorities and offer suggestions pertaining to the understanding and use of medications. While the American Medical Association’s health-literacy manual for clinicians recognizes minority ethnic/racial status as a risk factor for poor health literacy, it does not specifically tailor its recommendations for these minorities.

It should be possible to build upon existing public-health campaigns in order to correct misperceptions about the importance of treatment adherence by implementing programs with minority media regarding how to use medications and how to incorporate them into daily activities and by profiling best-case programs for enhancing adherence in minority communities.

Video demonstrations and online learning may be developed that show how skillful providers communicate effectively with minority groups concerning medications and the strategies they use to elicit accurate adherence information. Medical educators should include medication-adherence modules in cultural-competency programs, and clinicians should factor cultural, psychological, and lifestyle elements into personalized, evidence-based therapy for minority individuals. Such educational activities should be extended to continuing medical education and continuing professional development, residency training, and medical, pharmacy, and nursing schools.

Practitioners may also require additional training in communicating with minority patients regarding proper medication use. A national survey of resident physicians found that many residents felt unprepared to care for patients with cultural issues at odds with Western medicine, with religious beliefs that affect care, or with limited English proficiency. Half of residents said that they received only minimal training in cross-cultural communication and understanding. The study’s authors believe that these deficiencies may compromise the quality of care provided to patients as well as health outcomes. To improve the training of resident physicians, they recommend that cross-cultural curricula focusing on practical tools and skills be integrated into graduate medical education. Modules should include strategies to
avoid stereotyping, a framework for communicating across cultures, instruction on using interpreters, and skills for better understanding the community receiving care.\textsuperscript{275}

One way that clinicians may actively seek minority patients’ perspectives is to use ethnically based tools to address adherence. Mnemonic interviewing tools or templates have been designed to guide the provider through the interview with the patient and to identify cultural barriers and risk factors that affect adherence. These cross-cultural tools include ETHNIC (Explanation, Treatment, Healers, Negotiate, Intervention, Collaboration) and ADHERE (Acknowledge, Discuss, Handle, Evaluate, Recommend, Empower).

ETHNIC is a brief, structured questionnaire that guides the provider when interviewing the patient. “The ETHNIC mnemonic allows the provider to effectively elicit the patient’s beliefs about health and illnesses, learn about any self-treatment, traditional remedies, or alternative healers being used, and negotiate a mutually agreeable therapeutic plan with the patient, family, and other important individuals involved in the care process.”\textsuperscript{276}

ADHERE—another brief, structured questionnaire or framework—enables the provider to review consciously whether barriers to nonadherence have been addressed. “It is important to elicit and acknowledge the patient’s perspective about the proposed therapeutic plan, determine mutual goals and desired outcomes, discuss treatment strategies and the consequences of non-treatment, address any questions or concerns regarding treatment, evaluate patient health literacy and understanding of the reasons for treatment as well as barriers and facilitators to adherence, recommend and review the therapeutic regimen, and empower by eliciting the patient’s commitment and willingness to follow through.”\textsuperscript{277}

These education-based tools should promote awareness of racial/ethnic differences in side effects and response to drugs. For example, hypertension appears to exist in two broad physiological types, and the pattern of response of African Americans to the various classes of antihypertensive drugs differs from that of whites, with African Americans having a poorer response to angiotensin-converting-enzyme inhibitors.\textsuperscript{278} Further research should seek explanations for discriminatory prescribing patterns for some minorities, e.g., prescribing of older-generation antipsychotics to African Americans.

\section*{PATIENT EDUCATION}

Health-care organizations should provide education programs and interventions that increase patients’ skills and confidence in managing and assessing medication-related health problems. Educational materials should match cultural and literacy needs. Since families of minority patients are often important partners in medication management, health-care organizations should bolster this role through information, training, and education in the proper use of medicines. Managed-care and disease-management organizations should design care regimens and treatment protocols that account for the multidimensional needs of ethnic/racial minority patients. The use of Spanish-speaking staff may improve acceptance of, for example, insulin therapy among Hispanic patients.\textsuperscript{280} Lastly, patients should be educated in how to communicate with their providers.\textsuperscript{281}

\section*{MONITORING REDUCTIONS IN DISPARITIES IN PRESCRIBING AND ADHERENCE}

Health-care organizations should collect and stratify data about disparities in pharmaceutical treatment and outcomes by race, ethnicity, and language and integrate this information into ongoing quality-improvement, patient-safety, and disparity-reduction efforts. A tool kit to assist hospitals and health-care organizations in collecting race, ethnicity, and primary-language information from patients is available from the Health Research and Educational Trust.\textsuperscript{282}

Which pharmaceutical treatments should be prioritized for the elimination of disparities? One approach is to focus on validated quality-of-care measures for specific drug therapies. The Agency for Healthcare Research and Quality’s National Healthcare Quality Report, a comprehensive national overview of the quality of health care in
The Health-Care System, the Provider, and the Patient

The United States, identifies 46 core measures that represent the most important and scientifically credible measures of quality care for the nation. Nine of these core measures are specific to drug treatment and may be used to track disparities:

- HIV patients with CD4 counts under 200 who receive prophylaxis against *Pneumocystis carinii* pneumonia
- Children 19 to 35 months old who have received all recommended vaccines
- Adolescents 13 to 15 years old who have received three or more doses of hepatitis B vaccine
- Adults diagnosed with a new episode of depression and initiated on an antidepressant drug who have remained on an antidepressant medication through the continuation phase of treatment
- Persons aged 65 years and older who have ever received pneumococcal vaccination
- Rate at which antibiotics are prescribed at visits with a diagnosis of common cold per 10,000 population
- People with persistent asthma who have been prescribed medications acceptable as primary therapy for long-term control of asthma (inhaled corticosteroids)
- Tuberculosis patients who have completed a course of treatment within 12 months of treatment initiation
- Elderly with inappropriate medications

**DEVELOPING INFORMATION ON RESPONSES TO DRUGS BY MINORITY POPULATIONS**

Reports of different sensitivities to the actions and side effects of some drugs in minority populations indicate a need for well-designed clinical trials on effectiveness and optimal dosing of drugs in specific populations. However, racial/ethnic minority groups have been historically underrepresented in clinical research, and this is still the case despite a 1993 federal law mandating inclusion of women and minorities in clinical trials sponsored by the National Institutes of Health. Many reasons may underlie this disparity in clinical-trial participation. Study duration, treatment or intervention schedule, cost, time, follow-up visits, and side effects are likely barriers to participation among minorities. Minorities' cultural characteristics—including attitudes, beliefs, perceptions, and knowledge regarding clinical research—may pose additional barriers. Low socioeconomic status, speaking a primary language other than English, differences in communication style, mistrust of research and the medical system, fear, embarrassment, and lack of knowledge about disease may reduce participation rates. A survey found that blacks and Hispanics were 80% more likely than whites to be reluctant to participate in biomedical research, due to concerns about privacy and finances, mistrust, fear of contracting AIDS, or fear of being a “guinea pig.” Much additional research, with as many different minority populations as possible, is needed to clarify the factors that prevent and facilitate participation in trials.

It is widely believed that minorities, particularly African Americans, are reluctant to participate in clinical trials today because they distrust the medical establishment, partly due to the legacy of the Tuskegee Syphilis Study. However, this belief has been challenged. A comprehensive literature review found that African Americans and Hispanics were as willing (in some instances more willing) to participate in biomedical research as non-Hispanic whites when they were made aware of studies and the studies meet their medical requirements. However, this review found substantial differences in who was invited to participate. Seven of the 17 clinical and surgical intervention trials reviewed offered enrollment to fewer minority persons than expected based on the percentage of

*From 1932 to 1972, the US Public Health Service conducted a study on nearly 399 African American men, mostly sharecroppers from the poorest parts of Alabama. The men had syphilis, but they were told they were being treated for “bad blood.” No treatment was provided, allowing the disease to run its course so that the researchers could eventually perform autopsies to collect test results.
minorities in the population and the prevalences of the conditions being studied. In this study practical issues—including whether potential participants were informed of research opportunities, were medically eligible to participate, and had personal circumstances (e.g., child-care demands, job flexibility, geographic proximity to research sites) that allowed them to participate—often influenced participation. Patients' trust has been found to increase when personal physicians are involved in the clinical trial and details of the trial are provided.

Minority patients are likely to participate in clinical trials when they are made aware of the purpose of the trial and understand the value of participating. This was well illustrated in the enthusiastic participation of African Americans in the 2001–4 African American Heart Failure Trial (A-HeFT), an all-black clinical trial that found that patients taking BiDil (isosorbide dinitrate/hydralazine hydrochloride) had a 39% reduction in the rate of first hospitalization for heart failure and a 43% increase in survival rates.

Minority patients should be encouraged to participate in clinical trials through education about risks, benefits, and safeguards of modern drug-testing protocols.

**GENE TESTING FOR PERSONALIZED THERAPY**

Since the percentage of persons from minority groups having slow metabolism for certain drugs may differ from that of the majority population, dosage adjustments or prescribing of alternate agents may be required. Personalized drug therapy based on genetic testing is preferable to crude estimates of the likelihood of altered metabolism based on racial/ethnic category. Currently available technologies enable screening for variants in common drug-metabolism genes (e.g., CYP2D6, CYP2C19, and NAT2) and can identify 86% to 100% of persons with poor metabolism of the drugs metabolized by enzymes coded by these genes. Dozens of clinically important drugs used by members of minority groups are processed via the CYP2D6 pathway, including antidepressants, β-blockers, neuroleptics, and opioid agonists. The most common CYP2D6 polymorphism in East Asians, known as *10, slows (but does not totally halt) metabolism of drugs via that pathway. Although genetic testing would miss 18% to 43% of East Asians with this slow-metabolism gene variant, all of those testing positive for this variant will be slow metabolizers. As testing for metabolic variants becomes more common, prescribers should consider using these tests to avoid dosing errors and untoward reactions in minority patients.
ENDNOTES


Origins and Strategies for Addressing Ethnic and Racial Disparities in Pharmaceutical Therapy


The Health-Care System, the Provider, and the Patient


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The Health-Care System, the Provider, and the Patient


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